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EDITORIAL

Medico Legal Issues in Health Research are Over Challenging Now

Innovations of health research have been able to enrich our lives and provide insight into the world around us. The cornerstones of these advancements have been scientific health research. Health research is critical to the community for several reasons.

It appears that every week and even sometimes everyday on the news there is a fact about development in health research. News reports often overstate such results of medical research, often times before they are even completed. Sadly, while many clinical studies provide valuable data and lead to the creation of life saving drugs and medical treatments, the vast majority of trials do not. Obviously, there is also some danger and risk involved for the participants of health research, as generally the drugs or techniques used on them are unapproved for wide spread use in humans besides legal issues. In most cases drugs are first tested on animals, and then on different groups of human volunteers before being accepted legally.

The main purpose of such research publication is to discover answers to questions through the application of scientific procedures. To find out the truth which is hidden and which has not been discovered as yet, the research publication has to be an original contribution to the existing stock of knowledge, so that other can easily identify the problem. However, such research procedures may have lots of legal issues to be looked for.

The medical profession is a noble profession and it is exciting to think about its relationship with the law. The most intriguing aspect is of the ethical issues of the health research of the highly trained medical professionals and the entire team including the hospital staffs and management. With the upcoming new legislations relating to research, ICMR guidelines and international treaties, etc are really very challenging to overcome for the health researchers.

At times a number of legal issues are raised due to friction between rights, viz., fundamental rights as provided in the Constitution of India, rights created by a contract, rights as a consumer, rights as a citizen of India, rights as a patient and the corresponding duties of the State, hospitals both public and private, doctors, and others related to health care while we proceed for the human or animal experimentation, etc.

It becomes extremely difficult for the judges in courts even to draw the line between the acceptable and unacceptable conduct in the eyes of law in some cases. The codes and policies for any such research ethics are essential to be followed.

CODES AND POLICIES FOR RESEARCH ETHICS

Agreed the importance of ethics for the conduct of health research, it should come as no surprise that many different professional associations, government agencies, and universities have adopted specific codes, rules and policies relating to ethics for the research.

The following is the rough and general summary of some ethical principles that various codes address
[Adapted from Shamoo A and Resnik D. 2009. Responsible Conduct of Research, 2nd ed. (New York: Oxford University Press):]

HONESTY

Attempt for honesty in all scientific communications. Decently report data, results, methods and procedures, and publication status. Do not fabricate, forge, or distort data. Do not deceive colleagues, granting agencies, or the public.

OBJECTIVITY

Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected or required. Avoid or minimize bias or self-deception. Disclose personal or financial interests that may affect research.

INTEGRITY

Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.

CAREFULNESS

Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.

OPENNESS

Share data, results, ideas, tools, and resources. Be open to criticism and new ideas.

RESPECT FOR KNOWLEDGEABLE

PROPERTY

Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results without permission. Give credit where credit is due. Give proper acknowledgement or credit for all contributions to research. Never plagiarize.

CONFIDENTIALITY

Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.

RESPONSIBLE PUBLICATION

Publish in order to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.

RESPONSIBLE MENTORING

Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.

RESPECT FOR COLLEAGUES

Respect your colleagues and treat them fairly.

SOCIAL RESPONSIBILITY

Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.

NON-DISCRIMINATION

Avoid discrimination against colleagues or students on the basis of sex, race, ethnicity, or other factors that are not related to their scientific competence and integrity.

COMPETENCE

Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science as a whole.

LEGALITY

Know and obey relevant laws and institutional and governmental policies.

ANIMAL CARE

Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.

HUMAN SUBJECTS PROTECTION

When conducting research on human subjects, reduce harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.

The “International Journal of Health Research and Medico Legal Practice” is an international journal dedicated to the up gradation of health sciences and related disciplines. It pursues exceptionally to inspire multidisciplinary research and collaboration among experts, the industry and the healthcare specialists. It also provides an international forum for the communication and assessment of data, methods and findings in health sciences and linked disciplines. While conducting health research it is advisable to all medical professional to start respecting to those national and international legislations for the check of justice.

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REVIEW PAPER

Emerging Trends Related to Consent and Medical Practice in India

Yadav Mukesh*

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ABSTRACT

Consent is not merely a signing ceremony where the patient signs the consent from in front of the doctor. Consent is a mandatory exercise in medical practice that involves explaining and disclosing to the patient, the requisite information necessary for the patient to take an informed decision. Thereafter, the patient exercises the right to decide whether to give his/her consent or not. In a case before the National Consumer Dispute Redressal Commission (NCDRC), the patient alleged that, "the consent read as if the mastectomy had already been decided and only some of its features needed to be explained to the patient". Unfortunately, a majority of consents in India fall under this category. [R-6] It is difficult for the Court to accept contention of the doctor that because the general consent is taken, he can perform the operation in the way he likes. But, that would not give surgeon any discretion to do whatever surgeon chooses. This would also be against the medical ethics, and the purpose for which express consent is obtained. This paper deals with emerging trends related to issue of consent and medical practice in India based on Indian case law.

Key Words: Informed Consent, Oral Consent, General Consent, Negligence

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INTRODUCTION

Issue of consent is a low priority area for most of the doctors due to lack of awareness on legal rights of others and illiteracy of patients and as well as no awareness about their rights and no faith on judiciary due to complexity of legal procedures and cost of litigation.¹ The law as settled by the **Apex Court** in *Spring Meadows Hospital and Anr. Vs. Harjol Ahluwalia and Anr.* (1998):² ".....The relationship between the doctor and the patient is not always equally balanced. The attitude of a patient is poised between trust in the learning of another and the general distress of one who is in a state of uncertainty and such ambivalence naturally leads to a sense of inferiority and it is, therefore, the function of medical ethicist to ensure that the superiority of the doctor is not abused in any manner..."

In recent days there has been increasing pressure on hospital facilities, falling standard of professional competence and in addition to all, the ever-increasing complexity of therapeutic and diagnostic methods and all this together are responsible for the medical negligence. That apart, there has been a growing awareness in the public mind to bring the negligence of such professional doctors to light."²

CASE LAW ON SPECIFIC CONSENT

In a Consumer Court Case³ where doctor performed Vaginal Hysterectomy (VH) and taken written consent for TAH, decided by the NCDRC, doctor deposes in Paras 18 and 19 of her affidavit that "*Under the circumstances Gynecologists, with experience in vaginal surgery, would certainly prefer to perform hysterectomy through vaginal route. In the same situation, I would have also performed, vaginal hysterectomy, as it would have been in the interest of the patient.*"

NCDRC observed that then, in such set of circumstances, it cannot be said that the operating surgeon can carry out the surgery of his / her choice, because he / she may be expert in the field. If he/she does so, he/she does it at his/ her risk and mishap.³

ETHICAL ISSUES INVOLVED WITH CONSENT

The Complainant in a case, with regard to relevance of consent, has quoted excerpts of the Medical Code of Ethics, **as under:**

"The followings acts of commission or omission on the part of the physician shall constitute professional misconduct rendering him / her liable for disciplinary action. **7.16:** Before performing an operation the physician should obtain in writing the consent from the husband or wife, parent or guardian in the case of minor, or the patient himself as the case may be."⁴

AGE OF CONSENT (CAPACITY TO CONSENT)

Research paper titled "Age of Consent: Food for Thought"¹ has discussed in detail about the controversy in the literature on the issue of age of consent and its solutions. Even recently published guidelines and protocols for examination of woman for sexual offences⁵ has mentioned the age of consent as 12 years, which has inherent conflict with the definition and meaning of 'Examination' under Section 53, 53A of the Criminal Procedure Code, 1973.

CASE LAW ON CAPACITY TO CONSENT

In another consumer court case⁶ before NCDRC, following facts related to 'Issue of Consent' emerged:

Questions for Consideration: From the rival arguments summarised above, the issues that arise for determination in this case are as under:

- (i.), (ii.) and (iii.) Whether.....?
- iv. Whether the consent for the surgery obtained in this case can be considered a valid consent?
- v. Whether, in the given circumstances, there is a case of medical negligence/deficiency in service on the part of the NIMS and the doctors attending on Kumari? [Para 11]⁶

Question No. (iv and v) was related to issue of consent: NCDRC observed that as regards the **third issue of consent for the surgery**, the law on the subject has been laid down in Para 48 and 49 by the Apex Court in *Samira Kohli vs. Dr. Prabha Manchanda* [(2008)⁷]:

(b) The original record of the case before the State Commission shows that the consent for the surgery was recorded on 18.09.1997 in the following words:

"Consent for the surgery"

We have been explained the surgery, its necessity, associated risks/complications and the procedure of mastectomy and hereby give consent for the surgery of mastectomy, anaesthesia and blood transfusion as required necessary.

Signature: D. B. Eswari

Relationship: Daughter"

NCDRC observed that it is totally unclear why, when that consent was taken on 18.09.1997, it could not be Kumari's own consent because she had already been admitted as an inpatient.

Consent is a Process of Communication and not an event:

NCDRC emphasised that the law laid-down on the subject (supra) is explicit that when a patient is in a position to give consent, the consent has to be taken from him/her only.

NCDRC further added that, the doctor concerned (or at least a member of the team of doctors attending on the patient) has to explain the pros and cons of the disease and as well as the available and suggested courses of treatment. In this case, it is obvious that neither the Surgical Oncologist himself nor the Dr.Sridhar (Senior Resident) came and explained to Kumari before obtaining her consent (or, for that matter consent of D. B. Eswari) the whole process appears to have been carried out by some student nurse. Hence, we have no hesitation in holding that the "consent" taken in this case was neither "real" nor "valid." [Para 13]⁶

NCDRC concluded that, we have no hesitation in holding that the respondent NIMS was guilty of medical negligence and deficiency in service on the part of the main Doctors, viz., Dr. Raju and Dr. Prayag who provided treatment to D.H. Kumari that culminated in a hasty, medically unsupportable, rather insensitive and hence a most traumatic decision to remove her left breast. [Para 14]⁶

COMPENSATION AWARDED

NCDRC observed that while no amount of money can indeed compensate a woman of 46 years for the physical pain and injury, feelings of personal violation and emotional trauma caused by a set of negligent acts leading to removal of a breast.

NCDRC holds that in our view, the ends of justice in this much-delayed case would perhaps be met if the sum of Rs. 10 lakh were awarded as compensation. [Para 15(a)]⁶

CONSENT AND CIVIL AND /OR CRIMINAL ACTION

The **M.P. State Commission** observed in a case⁸ that 'in medical field the word 'consent' carries a great importance. The concept of consent is not new to the modern world. Consent plays a remarkable legitimate role in the field of medical negligence. The consent should be a **free consent** as envisaged by **Section 10 of the Indian Contract Act** in the context of medical negligence.

A duty is cast upon a medical practitioner to provide that he did not use any **undue influence** in order to get a legally valid consent from a patient and he has at no point of time utilized his **dominant and superior position** in obtaining consent from **patient** who is always practically in a **precarious need** and **difficult position**. In case the consent is not obtained that will give rise to cause of action for seeking a remedy criminally for making any invasive procedure without consent of patient amounting to assault, with criminal force under **Section 350 IPC** and also seek civil remedy for compensation for the injury occurred to the patient in accordance with Law of Tort.⁸

According to **Law of Tort**, if the doctor does not seek a legally valid consent, and even if there are no damages in the form of negligence, the patient can sue the doctor for injury upon his personal or private rights encroached upon which has been endowed upon him by legislative enactment.⁸

The Commission further observed that the **principle requiring consent** applies in all the cases except in certain circumstances in which a doctor may be entitled to

proceed without patient's consent, **firstly**, when the patient's balance of mind is disturbed; **secondly**, when the patient is incapable of giving consent by reason of unconsciousness; and **finally**, when the **patient is a minor**.⁸

ISSUE OF CONSENT IN AN UNUSUAL CASE

Division Bench of the SC, in a case⁹, concerned with two minor girls, conjoined twins, faced with a situation where their parental consent is not forthcoming either for investigation or for the surgical operation. [Para 10]⁹

Saba and Farha, Craniopagus Twins (CTs), both female, are minors, togetherness, of course, will not bring joy to them or to their parents, to the family members or the people at large who happen to see them or heard about them. SC Bench observed that the doors of this Court have been knocked by a Good Samaritan and since this Court has a fundamental duty to look after the interest of minor children, especially when they are CTs, fighting for their lives. [Para 2]⁹

SC had shown its dilemma in such situation in following words: we spent sleepless nights to find out a solution. Seldom society cares or knows the mental and psychological trauma, in such situations, Judges undergo, especially, when they are called upon to decide an issue touching human life, either to save or take away. [Para 2]⁹

This case discussed "least detrimental test", Conflict of interest, rights of the minors, their right to life, their inter-se rights, inherent value of lives, right to bodily integrity, balancing of interests, best interest standards, parents views, courts' duty, doctors duty etc.⁹

Scope of consent and need for 'Specific Consent': NIMS vs. Prasanth S. Dhananka and Ors., 2009¹⁰ was the First case in India where compensation of more than one crore has been awarded by the court of law. [Para 35]¹⁰ The complainant, who has argued his own case, had submitted before the SC in appeal, claimed about 7.50 Crores as compensation under various heads. He had, in addition sought a direction that a further sum of Rs. 2 crores be set aside to be used by him should some developments beneficial to him in the medical field take place. [Para 37]¹⁰

Para 16-19 of the Judgment¹⁰ deals with issue of 'consent' as follows:

.....It was also pleaded that the consent that had been taken was only for the purpose of an excision biopsy which was an exploratory procedure, but Dr. Satyanarayana had carried out a complete excision removing the tumour mass and the fourth rib thereby destroying the inter-costal blood vessels leading to paraplegia and had a Neuro-surgeon been associated with the operation, this problem could well have been avoided. [Para 2]¹⁰

NCDRC believed on 'Implied Consent':

The NCDRC has observed that as blood had been donated by the relatives of the complainant, it was likely that they had the information that a surgery was planned, as they were educated and enlightened persons. The Commission has, accordingly, held on the basis of the evidence of Dr. Satyanarayana "that once the consent for excision biopsy through thoractomy was given, the consent for a moment (sic) (removal?) of the mass was implied." [Para 16]¹⁰

NEED FOR SPECIFIC CONSENT EMPHASIZED BY THE SC

It must, therefore, be held that the withholding of the aforesaid document raises a presumption against the NIMS and the attending Doctors. **We find that the consent given by the complainant for the excision biopsy cannot, by inference, be taken as an implied consent for a surgery (save in exceptional cases).**

STERILIZATION OPERATION CANNOT BE JUSTIFIED UNDER THE PRINCIPLES OF NECESSITY

In *Murray vs. McMurchy* (1949)¹¹, the Supreme Court of British Columbia, Canada, was considering a claim for battery by a patient who underwent a caesarean section. During the course of caesarean section, the doctor found fibroid tumours in the patient's uterus. Being of the view that such tumours would be a danger in case of future pregnancy, he performed a sterilization operation. The Court upheld the claim for damages for battery. It held that sterilization could not be justified under the principles of necessity, as there was no immediate threat

or danger to the patient's health or life and it would not have been unreasonable to postpone the operation to secure the patient's consent. The fact that the doctor found it convenient to perform the sterilization operation without consent as the patient was already under general anesthesia was held to be not a valid defense.

The Court of Appeal in England in *F.* expressed a somewhat similar view, *In re, (1933)*¹². It was held that the additional or further treatment which can be given (outside the consent procedure) should be confined to only such treatment as is necessary to meet the emergency, and as such needs to be carried out at once and before the patient is likely to be in a position to make a decision for himself.

Lord Goff observed (All ER p.566g-j)

"...Where, for example, a surgeon performs an operation without his consent on a patient temporarily rendered unconscious in an accident, he should do no more than is reasonably required, in the best interests of the patient, before he recovers consciousness. I can see no practical difficulty arising from this requirement, which derives from the fact that the patient is expected before long to regain consciousness and can then be consulted about longer term measures." [Para 17]¹⁰

The Court also considered the possibility that had the patient been conscious during surgery and in a position to give his consent, he might have done so to avoid a second surgery but observed that this was a non-issue as the patient's right to decide whether he should undergo surgery was inviolable. This is what the Court had to say:

"It is quite possible that had the patient been conscious, and informed about the need for the additional procedure, the patient might have agreed to it. It may be that the additional procedure is beneficial and in the interests of the patient. It may be that postponement of the additional procedure (say removal of an organ) may require another surgery, whereas removal of the affected organ during the initial diagnostic or exploratory surgery would save the patient from the pain and cost of a second operation. Howsoever practical or convenient the reasons may be, they are not relevant. What is relevant and of importance is the inviolable nature of the patient's right in regard to his body and his right to decide whether he should

undergo the particular treatment or surgery or not. Therefore at the risk of repetition, we may add that unless the unauthorized additional or further procedure is necessary in order to save the life or preserve the health of the patient and it would be unreasonable (as contrasted from being merely inconvenient) to delay the further procedure until the patient regains consciousness and takes a decision, a doctor cannot perform such procedure without the consent of the patient." [Para 18]¹⁰

Issue of Confidentiality and Privileged Communication and Consent:

Cases came before Hon'ble SC^{11,12} in the year 1998, 2002 on the issue of 'Breach of Confidentiality' and 'Privileged Communication' where 'Right to Privacy' has been comprehensively discussed in relation to Consent.

INFORMED CONSENT FOR UNDERTAKING HIV TEST OR TREATMENT:

Subject to the provisions of HIV Act

- i. No HIV test shall be undertaken or performed upon any person; or [Chapter III, Informed Consent, Section 5(1)(a)]¹³
- ii. No protected person shall be subject to medical treatment, medical interventions or research, except with the informed consent of such person or his representative and in such manner, as may be specified in the guidelines. [Chapter III, Informed Consent, Section 5(1)(b)]¹⁴

Not a one time event, but an ongoing process: The informed consent for HIV test shall include pre-test and post-test counseling to the person being tested or such person's representative in the manner as may be specified in the guidelines. [Chapter III, Informed Consent, Section 5(2)]¹⁵

CONSENT EMERGING TRENDS IN INDIA

HIV Bill, 2014 important provisions:

1. There are 50 Clause and XIV Chapters in HIV/AIDS Bill, 2014 introduced by then Union Minister of Health and Family Welfare, Mr.GhulamNabi Azad on *The 31st January, 2014*¹⁶

2. To prohibit certain specific acts of HIV-related discrimination, provide for informed consent for undertaking HIV test or treatment and also for disclosure of HIV status to ensure confidentiality and privacy, obligation of the establishments.

3. To ensure confidentiality and privacy while providing HIV and AIDS related services "**Informed consent**" means consent given by any individual or his representative specific to a proposed intervention without any coercion, undue influence, fraud, mistake or misrepresentation and such consent obtained after informing such individual or his representative, as the case may be, such information, as specified in the guidelines, relating to risks and benefits of, and alternatives to, the proposed intervention in such language and in such manner as understood by that individual or his representative, as the case may be; [Section 2(n)]¹⁷

4. "**Capacity to consent**" means ability of an individual, determined on an objective basis, to understand and appreciate the nature and consequences of a proposed action and to make an informed decision concerning such action; [Section 2(b)]¹⁸

5. "**Child affected by HIV**" means a person below the age of eighteen years, who is HIV-positive or whose parents or guardian (with whom such child normally resides) is HIV-positive or has lost a parent or guardian (with whom such child resided) due to AIDS or lives in a household fostering children orphaned by AIDS; [Section 2(c)]¹⁹

6. "**HIV-related information**" means any information relating to the HIV status of a person and includes:

- Information relating to the undertaking performing the HIV test or result of an HIV test;
- Information relating to the care, support or treatment of that person;
- Information which may identify that person;
- Any other information concerning that person, which is collected, received, accessed or recorded in connection with an HIV test, HIV treatment or HIV-related research or the HIV status of that person; [Section 2(l)(i), (ii), (iii), (iv)][15]

7. "**HIV test**" means a test to determine the presence of an antibody or antigen of HIV; [Section 2(m)]²⁰

CONCLUSIONS

Consent is an issue of respect for human rights of an individual under international law and under Indian Constitution. It is a low priority area among medical fraternity due to lack of proper training and understanding in curriculum for medical education.

There is need to include topics on consent in the medical curriculum with adequate time allotted for its teaching at the level of Medical Council of India, responsible for maintaining quality of medical education and healthcare in India.

Ethical Regulations, 2002⁴ of framed by MCI hardly discussed on the issue, even age of the consent has not been mentioned in it causing confusing literature in textbooks published in India. There is need for comprehensive document like UK's GMC Guidelines with Problem Based case laws.

Recently introduced HIV/AIDS Bill¹⁵ is a comprehensive document on the issue of 'Informed Consent' discussed from definition, capacity for consent till provision of information and counseling for HIV/AIDS testing and treatment with consent.

Many research papers^{16, 17, 18} has covered various relevant issues related to consent, age of consent, real vs. informed consent, etc. to create awareness among medical fraternity. Properly informed written consent before operation is the necessity.¹⁷

It was suggested that either by filing a PIL, the issue of age of consent in medical profession can be solved. Alternatively Medical Council of India in consultation with Indian Medical Association and other professional and ethical bodies can come to a consensus about the age of consent. Accordingly authors of the books dealing with this topic edit their books to provide clear information about this human rights issue.¹

With the creation of "Social Justice Bench" of the Hon'ble Supreme Court, court cases related to public interest, human rights issue related to health and consent are bound to come before the SC in future.¹⁹ It is advisable to medical fraternity to start respecting fundamental rights of patients, especially related to issue of consent.

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Dr. Arijit Dey, Post Graduate Trainee of NRS Medical College, Calcutta, India was awarded the best Poster at ICFMT conference held at Greater Noida, UP in 2014

REVIEW PAPER

Agnosia, Apraxia and Disconnection Syndrome

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ABSTRACT

Cognitive motor disorders other than language and memory deficit that usually occurs as a squeal or presenting manifestation to stroke or other neurodegenerative diseases are not very uncommon. With the advancement of newer functional imaging studies we are now having better ideas regarding involvement of specific cortical areas and network in connection with different cognitive dysfunction. Although no specific pharmacological treatments are available, the underlying causes should be treated. Occupational therapy and cognitive rehabilitation may be helpful in some of these patients. In this review we will discuss the current knowledge on agnosia, apraxia and disconnection syndrome.

Key Words: Disconnection Syndrome, Aphasia, White Matter Tract

INTRODUCTION

Agnosia and apraxia refers to rare neuro cognitive disorders resulting from stroke or degenerative diseases of central nervous system. Agnosia is a failure of recognition that cannot be attributed to elementary sensory deficit, mental deterioration, attentional disturbances, aphasic misnaming or to unfamiliarity with external stimuli. Agnosia is characteristically modality specific. Apraxia refers to difficulty performing motor acts which cannot be accountable by lack of understanding of the task, weakness or proprioceptive loss. Disconnection syndrome, first described by Karl Wernicke, as disorder related to disruption of white matter association tract connecting two cortical areas of same or opposite hemisphere. The four classical disconnection syndromes described are: conduction aphasia and visual agnosia as described by Wernicke, apraxia by Lipmann, and pure alexia by Dejerine.

DISCUSSION

Agnosia is a relatively rare neuropsychiatric symptom first introduced by Sigmund Freud in 1891, to denote disturbance in the ability to recognize and name objects, usually in one sensory modality, in the presence of intact primary sensation¹. General public were familiar with the termagnosia from Oliver Sack's story "The Man Who Mistook His Wife for a Hat". Criteria for diagnosis of agnosia²: 1) failure to recognize an object; 2) normal perception of the object, excluding an elementary sensory disorder; 3) ability to name the object once it is recognized, excluding anomia as the principal deficit; 4) absence of generalized dementia.

To diagnose agnosia, the examiner must establish that the deficit is not a primary sensory disorder, as

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documented by tests of visual acuity, visual fields, auditory function and somatosensory function, and not part of a more general cognitive disorder, such as aphasia or dementia, as established by bedside mental status examination.

Visual agnosia refers to loss or impairment of the ability to recognize things visually with preserved ability to recognize them through touch or hearing in the absence of impaired primary visual perception or dementia³. It is divided by Lissauer into two subtypes: apperceptive and associative. In apperceptive visual agnosia there is perceptual defect distorting the visual image so that patient fails to appreciate the whole object but they can pick out feature of an object correctly such as lines, angles, colours⁴. This type of visual agnosia usually occurs in patients with bilateral occipital lesions. The patient may be able to see parts but not the whole, e.g. she may not be able to distinguish a circle from a square. Associative visual agnosia refers to global inability to identify objects but patient can readily identify the same object using other sensory modalities such as tactile or auditory modality occurs in lesions with bilateral posterior hemisphere, often involving the fusiform or occipitotemporal gyri and sometimes the lingual gyri.

Visual object agnosia (optic aphasia) is an associative visual agnosia causing an inability to recognize things that is not due to visual impairment, cognitive deficit, inattention, aphasic misnaming, or unfamiliarity. Patient may be able to see the object, even describe it, but have no idea what it is or what it is called. It must be distinguished from anomia. The patient with anomia cannot recognize the object when presented by another modality (e.g. touch). The anomic patient able to demonstrate the object by gesture (e.g. appropriately applies a comb to her hair, yet not be able to call it comb). The patient with agnosia doesn't recognize the comb as a comb and has no idea what to do with it.

Finger agnosia refers to loss or impairment of the ability to recognize, name, or select individual fingers of the patient's own hand or hand of the examiner. Testing for finger agnosia is usually combined with assessment for the right left confusion. Finger agnosia and right left confusion along with agraphia and acaleulia, make up Gerstmann's syndrome and lesion is likely in the region of dominant angular gyrus⁵.

Prosopagnosia is the inability to recognize familiar faces. The patient may recognize face as a face but cannot associate it with a particular individual, usually occurs lesions involving bilateral occipitotemporal areas especially lingual, fusiform and parahippocampal gyr. Facial perception is localised to fusiform gyri but recognition of familiar facies requires anterior temporal memory stores. Prosopagnosia can be described on the basis of disconnection syndrome hypothesis as there are interruptions of fibres passing from the occipital cortex to the memory storage centre⁶. Astereognosis is loss of the ability to recognize and identify an object by touch despite intact primary sensation modalities. Although this represent deficit of cortical sensory loss, it can be described as apperceptive tactile agnosia. It is tested by asking the patient to identify, with eyes closed, common objects placed into her hands (e.g. coin, key). It usually indicates a lesion involving contralateral parietal lobe, may also occur with lesions involving anterior corpus callosum and thalamic radiation. In auditory agnosia patient is unable to recognize sounds (e.g. striking a match, ringing a bell), but can recognize the objects by sight or touch. The site of lesion is in the posterior part of the temporal convolution of the bilateral hemisphere (mostly dominant) especially the primary auditory cortices in Heschel's gyri. Tactile agnosia refers to a disorder of object recognition via tactile modality e.g. touch. There are several mechanisms for tactile agnosia, varies from right hemispheric lesion to disconnection syndrome. Autopagnosia is loss or impairment of ability to name and recognize body parts. Phonagnosia, which is analogous to prosopagnosia in the visual modality is the failure to recognize familiar people by their voices due to lesion of right parietal lobe. Simultagnosia, first described by Wolpert in 1924, is the ability to perceive only one object at a time. It is usually occurs due to lesion of left occipital lobe.

Apraxia (Greek, *praxis*—action) is the inability to carry out a high level, familiar, and purposeful motor act in the absence of any weakness, sensory loss or other deficits involving the affected part⁷. There are many variant of apraxia, we are going to discuss the types of most clinical importance.

A loss of the ability to make precise, independent but coordinate movements is called limb-kinetic apraxia. It can be tested by asking patients to rotate a coin between their thumb and index and middle finger as rapidly as

they can. Patients with limb kinetic apraxia have trouble rotating the coin and appear slow and clumsy, often also dropping the coin. This type of apraxia often occurs in the limb contralateral to hemisphere lesion.

Failure to adopt the correct posture of the arm and hand, to move the limb correctly in space and at the correct speeds, or to properly orient the limb to the goal of the action is called ideomotor apraxia (IMA). It is one of the most common types of apraxia. In right handed person, IMA almost always is associated with left hemisphere lesions, but in left handed person, IMA usually is associated with right hemisphere lesions. IMA is also associated with lesion of some other structure of brain e.g. corpus callosum, inferior parietal lobe, premotor area, rarely with basal ganglia and thalamus (pulvinar).

The inability to correctly order a series of movements to achieve a goal is called ideational apraxia. To test for ideational apraxia the patients should be tested for their ability to perform multistep sequential tasks. For example, when asked to demonstrate how to mail a letter, the patient may seal the envelope before inserting the letter. Ideomotor apraxia most often is associated with degenerative dementia but also may be seen with focal lesion of left hemisphere.

In constructional apraxia, the patient is unable to copy geometric forms of any complexity because of impaired visuospatial skill. She may be able to draw a square but not a 3-dimensional cube. In dressing apraxia, the patient loses the ability to clothe correctly. A useful test for dressing apraxia is to turn one sleeve of the hospital gown inside out, and then ask the patient to put it on. Patient with dressing apraxia often gets confused. Both constructional and dressing apraxias are found due to lesion of non dominant parietal lobe.

Disconnection syndrome: Disconnection syndrome, first described by Karl Wernicke (1848-1904), as disorder related to disruption of white matter association tract that connect different cortical areas with sparing cortical areas of origin⁸. Wernicke was the first to suggest such a pathoanatomic mechanism might exist when he described leitungsaphasie (conduction aphasia). Almost a century later, Geschwind^{9, 10} expanded and popularized the concept, describing several new examples. In Geschwind's theory, lesion of association cortex if extensive enough, act to disconnect primary receptive or motor areas from

other region of the cortex in the same or in the opposite hemisphere. Some of the disconnection syndrome we are going to discuss here are: alexia without agraphia, pure word deafness, conduction aphasia, agnosia and apraxia.

The syndrome of alexia without agraphia was described by Dejerine in 1892, also known as pure word blindness, central aphasia, pure alexia^{11, 12}. By definition, alexia is acquired inability to read. The patient is able to speak, understand and write, both spontaneously and to detection, but cannot understand or copy the written word. There is an associated right homonymous hemianopia or right upper quadrantanopia. These patients have lesion of left occipital lobe with involvement of splenium of corpus callosum often due to infarction of the territory of the posterior cerebral artery.

Patient with pure word deafness are unable to comprehend spoken language although they can read, write, or speak in a relatively normal manner. The syndrome is "pure" in the sense that it is relatively free of aphasic symptoms found with other disorders affecting language comprehension. This disorder was first described by Kussmaul(1877). Lichtenstein (1885) defined the disorder as "the inability to understand spoken words as an isolated deficit unaccompanied by disturbance in writing or understanding of the printed words". This is a rare defect and responsible pathology is typically bitemporal or dominant temporal, causing disconnection of primary auditory cortex from the left hemisphere Wernicke area.

Conduction aphasia was described by Karl Wernicke in his thesis "The aphasic symptom complex" which contained a description of the disconnection syndrome, who also called it leitungsaphasie⁸. Prototype of all other disconnection syndrome, conduction aphasia is characterised by poor repetition with preservation of other language function, i.e. patient is fluent and comprehension is unaffected. Wernicke originally postulated that a lesion disconnecting Wernicke's and Broca's area would produce this syndrome. Geschwind later pointed to the arcuate fasciculus, a white matter tract travelling from the deep temporal lobe, around the sylvian fissure, to the frontal lobe, as the site of disconnection. The etiology is most often an embolic occlusion of terminal branch of middle cerebral artery.

In agnosia, which has been already described, there is a lesion that spared visual cortex but involved its white

matter output, results in visual sensory images being disconnected from other brain area. The consequences will be inability to recognise common objects presented visually.

In apraxia (ideomotor), the patient is unable to perform a complex command (e.g. salute, wave good bye) with the involved extremity. The patient sometime may substitute a hand or finger for the imagined object (e.g. raking her fingers through her hair instead of showing how to use a comb). Liepmann in his classical description on apraxia, presented a diagnosis of mixed aphasia and dementia^{13,14}. A striking feature of the patient was that although his spontaneous movements were normal, when asked to perform or copy gesture with his hand (e.g. point to your nose) or manipulate imaginary object (e.g. how to use a comb), he did so in an absurd manner. Since the patient had no visual impairment and no paralysis, Liepmann hypothesised a disconnection of visual, auditory and somatosensory areas from motor area. Later, he described that a lesion localised to the left parietal lobe (dominant) disconnected the left hand area from visual, somatosensory and auditory input, leading to bilateral apraxia whether, a lesion of the anterior portion of corpus callosum disconnected the right hemisphere from the left leading to unilateral left hand apraxia.

CONCLUSION

Disconnection syndrome, as originally outlined by Wernicke and his associates as disorders of higher function resulting from a disconnection of association white matter tract lesion, still exists today with the expansion of association with different other diseases. Also, agnosia and apraxia, representing neurocognitive disorders, can produce significant everyday impairment. Clinicians should be aware of these key symptoms, characteristic neuroradiological findings and neuropsychological based approach that will help to learn more about these rare complex disorders.

Conflict of Interest: Nil.

Contribution of Authors: We declare that this work was done by the authors named in the article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

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REVIEW PAPER

Body Donation and its Importance in Teaching of Anatomy

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ABSTRACT

Learning, teaching and research on human anatomy is mainly based on cadaveric dissection. In medical science, cadaveric dissection gives a better understanding and knowledge in the teaching and learning of human anatomy. There is an ever increasing demand and scarcity of bodies for anatomical dissections in medical institutions. Unclaimed bodies are no more the best source of cadavers. The bodies that are coming from the body donation programmes are a noble and novel source and should be encouraged by all. Body donation may be defined as act of giving one's body after death for medical education and research purpose. It is governed by Anatomy Act of different states in our country. A variety of factors including age, religion, culture, personality characteristics, views of death and mortality, body image and humanitarian concerns influence people's perception towards body donation. Since the donated bodies are used to study the normal structure of the whole human body, all donated bodies are not usually accepted. It is the supreme and ultimate to those who wish to be useful to the humankind.

Key words: Dissection, Cadaver, Anatomy Act

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INTRODUCTION

Anatomy is one of the basic branches in medical science and its proper knowledge is having immense importance in the proper diagnosis and treatment of diseases. Many advances in medicine and surgery can be directly linked to a better understanding of the structure and function of the human body. Our understanding of the structure of the human body has evolved over millennia from the earliest speculations to the beginning of the scientific era. Teaching and learning of human anatomy by medical students is indispensable in the beginning of their medical career. Learning and research on human anatomy is mainly based on cadaver dissection. The cadaveric dissection gives us a sound knowledge of both macroscopic and microscopic anatomy. However, there is an ever increasing demand and scarcity of bodies for anatomical dissections in medical institutions. The bodies that are coming from the body donation programmes are a noble source and should be encouraged by all. Body donation is defined as act of giving one's body after death for medical education and research and thus a person can give back to society and give a student a chance to learn something that can influence generations to come¹. The terms anatomical donation or body donation or body bequest is commonly used and synonymous. Delmas² stated that body donation is a clear will made by people free and informed.

We present a brief discussion on various aspects of the noble, generous and unselfish act of body donation.

ANATOMY ACT AND BODY DONATION

Body donation in the UK is governed by the Human Tissue Authority under the auspices of the Human Tissue

Act 2004. The Anatomy Act, ratified by various countries in the world provides for the supply of unclaimed bodies to medical and teaching institutions for the purpose of anatomical examination and dissection and other similar purposes³. The Anatomy Act, enacted by various states in our country provides for the supply of unclaimed bodies to medical and teaching institutions for the purpose of anatomical examination and dissection and other similar purposes. Cadavers used by these institutions are usually unclaimed bodies obtained by the police. Sometimes, bodies are also donated by relatives of the deceased to teaching institutions according to the dead person's wishes. An unclaimed cadaver can be obtained legally for the purpose of dissection.

Anatomy act is a State Act propagated by the legislature and published in the State Government Gazette⁴. The Act regulates the use of dead bodies for medical purposes. Almost everyone can donate for medical research and education. Age, disease, or state of health does not necessarily eliminate an individual from being a donor, but may affect tissues or organs which are actually used. All donors are screened for infectious diseases like AIDS, hepatitis B and C, active tuberculosis, syphilis, and spore bearing organisms like C. Tetani, etc. Donors who are known to be infected with any of these diseases are refused for donation due to the risk to medical investigators and procurement personnel.

In this situation of increased demand and expanding needs in medical education and research, issue of body donation remains critical. However, many individuals have recognized and understood these needs and have donated their bodies voluntarily. In response to public interest in making contributions to medical science, state legislatures have enacted laws to support such generosity. In an editorial, Patnaik⁵ suggested that in order to remove the discrepancies existing between any two or more such acts, a uniform draft act should be made applicable to all the states to use as model of guiding principles for amendment of Anatomy Acts.

ANATOMY ACTS IN INDIA

In India, the Anatomy act was enacted for the first time in 1949 and is also known as The Bombay Anatomy Act, 1949 and was published in Bombay Government Gazette, Part IV, on the 22nd April 1949⁴. Since then all the states of India enacted the Anatomy Act. The Anatomy

Acts of India generally provides legal clearance for the collection of a dead body for teaching purpose, only if death occurs in a state hospital or public place within the prescribed zone of a medical institution, provided the police have declared a lapse of 48 Hours that there are no claimants for the body and it could be used for medical purpose⁶. The Mysore Anatomy Act 1957 later amended as the Karnataka Anatomy Act⁷ defines "unclaimed body" means the body of a person who dies in a hospital, prison or public place or a place to which members of the public have got access and which has not been claimed by any person interested within such time as may be prescribed. The Assam state Anatomy Act of 1972 states " if a dead body is not claimed within 24 Hours inspite of information to relatives by police in cases where the near relatives is a resident of the same district, the body shall be treated as an unclaimed body."

The Delhi Anatomy Act provides for supply of unclaimed bodies of deceased persons to teaching medical institutions for Anatomical examination and dissection. It also provides procedure for disposal of unclaimed bodies in hospitals, prisons and public places. The Punjab Anatomy Act of 1963, makes a provision for the supply of bodies of deceased persons to hospitals, medical teaching institutions for therapeutic purposes or of anatomical examination, dissection, surgical operation and research work. The said act of Punjab states about taking possession of the unclaimed dead bodies in hospitals, prisons, public places for the aforesaid purpose. The said act also provides that a person having no permanent place of residence in the areas where his death has taken place, dies in a public place in such area and his body is unclaimed, the authorized officer of that area shall take possession and should hand over to the authorities in charge of an approved institution for the purpose specified¹.

BODY DONATION AND SUITABILITY

Since the donated bodies are used to study the normal structure of the whole human body, all donated bodies are not usually accepted. The decision of acceptance or rejection of a donated body is taken by the authority of the medical institute at the time of donation. As per law, the institution has the right to reject a body donation for any reason. Some of the major reasons for rejection of a donated body are emaciation or obesity, extensive burns, mutilation, advanced decomposition or a history of

contagious diseases (i.e. hepatitis B & C, AIDS, active tuberculosis, syphilis, etc.), suicide or homicide, removal of organs (except for eyes), etc³.

IMPORTANCE OF BODY DONATION

Dissection of human body for learning anatomy can be traced back to the 3rd century BC where Greek physicians Herophilus of Chalcedon and Erasistratus of Chios performed human dissections in Alexandria, Egypt. Later on, of course, Roman law prohibited dissection and autopsy of the human body. No new dissection studies were done until the early 14th Century. Medical professionals to enhance their skills and learn them test new surgical techniques and new medical instruments on human bones, joints and tissue. It is better to learn on cadaver how to use instruments than to experiment on patients⁸. Dissection of the human body is the only method of direct observation and measurement of the structures, organs, bones, ligaments and tendons that allow the body to function. Direct dissection is a fundamental part of the training of physicians and other care providers. Physicians cannot treat disease or trauma without a complete knowledge of anatomy. There is no substitute for the human body in the teaching and learning of human anatomy. Prakash et.al⁹ mentioned that dissection of human cadavers provides an emotional as well as intellectual approach to medical education. The experience and education gained through dissection cannot be replaced by any artificial substitutes, simulations or textbooks. An old Chinese proverb says "I hear I forget, I see I remember and I do I understand". "Therefore, when someone donates his/her body after death; helps in training of next generation of doctors for the betterment of mankind as a whole". Bodies donated by patients themselves are the ultimate gift that needs continued appreciation by educators⁸.

FACTORS GOVERNING BODY DONATION

There is insufficient number of cadavers to do the dissection in medical institutions of our country. This may be on account of low number of unclaimed bodies in a small state of our country. Moreover, the number of medical institutions is also increasing in our country which is also one of the contributing factors in the scarcity of cadaver. Therefore increasing the number of body donation may be a probable solution. However body donation has been a critical issue so far in this part of the

world. Very few studies are available to determine the factors responsible for body donation. In a report, Fennell and Jones¹⁰ found that the most frequent reasons for making a body bequest were to aid medical science and gratitude to the medical profession. In another report by Boulware et al¹¹ demographic and attitude factors were found to be strongly related in willingness to consider whole body donation. In another study in United States, Chung and Lehman concluded that the existing consent procedures for cadaver donations at United States medical schools did not provide sufficient information to the potential donors to constitute a fully informed consent. In another study by Boulware et al.¹² found that demographic, cultural and clinical factors associated with willingness to donate cadavers, whereas it was different in case of living related organ donations. Golchet et al¹³ found a variety of factors including age, religion, culture, personality characteristics, views of death and mortality, body image and humanitarian concerns influencing people's perception towards body donation. Funnell and Jones in their case studies observed that, the most common reasons for making body donation were to help medical science and gratitude to the medical profession¹⁴.

BODY DONATION AND DONOR'S ATTITUDE

Bolt S. et.al mentioned in their studies that most donors are primarily driven by altruism and their desire to aid the advancement of medical knowledge and to be useful after death¹⁵. In a survey by Richardson and Hurwitz published in Lancet, on 218 donors to ascertain attitudes towards body donation reported the overwhelming rejection of the view of money incentives to promote donation. The study found that the anxiety of disrespectful behavior toward cadavers was one of the reasons for not donating bodies¹⁶. Sehirli et al.¹⁷ reported that although anatomists encourage cadaver donation, the attitudes of anatomists toward donating their own bodies for dissection is not well known.

In a monumental review article from Northeast India, Ajita R and Sing YI¹ commented that attitude of donors plays a crucial role in body donation. The review also commented that the most major religions support donation as an act of human kindness, but people are often unaware of their faith towards donation and may be misled by old superstitions or misreading of religious texts and ultimately leading to hesitation in giving consent for donation. Lagwinski M et.al¹⁸ had been observed that the

main obstacles for the body donation were based on diversities: legal, cultural, religious, sociological, educational and economical. Cantarovich¹⁹, in his study, observed about the lots of resistance towards body donation. According to him some of the major reasons are: lack of awareness, religious uncertainties, distrust of medicine, hostility to new ideas and misinformation. Gillman²⁰ analyzed the views of the major faith groups about donation and concluded that the large majority of faiths take a positive stance towards donation. Arraez-Aybar et al.²¹ observed in their study that Anatomy teachers are generally in favor of donation (86.5%), especially of organs alone (52.7%) and this aspect was not affected by their religious beliefs. Ballala et al.²² studied the knowledge, attitude, and practices regarding whole body donation among medical professionals in a hospital in India. Their results suggested that the knowledge, attitude, and practices regarding whole body donation were very poor among the medical profession and educating them regarding the altruistic act of body donation is as important as educating the general public which is very shocking.

ROLE OF MASS MEDIA

Conesa et al (2004) done a study to observe the impact of different sources of media such as television, hoardings and posters, campaign on donation and information by healthcare professionals on the awareness of body donation among the public. Television was found to be having the greatest impact towards body donation, followed by press and radio and the third is magazines and talk with friends and family. The fourth is hoardings and posters, and campaigns about organ donation; and last factor is information given by health professionals²³. Jadhav D.S and Zambre R. B.²⁴ mentioned in their review article that the media with the greatest impact on the population is television; the second factor is the press and radio; the third is magazines and talks with friends/family; the fourth is hoardings and posters, and campaigns about organ donation; and the last factor is information given by health professionals. It was concluded that opinion on donation is more favorable among subjects who have received information on an individual basis and at specialized meetings.

It was mentioned that individuals must be encouraged to donate their bodies and bodily material through advertising campaigns among people, while ensuring that

elements of trust, consent and confidentiality are strictly adhered to and also mentioned for offering financial incentives in the form of providing for the whole cost of funeral of that donor²⁵.

CONCLUSION

In our country, willed body donation programs are still in budding stages. Voluntary donation of body is not much different from donation of organs including eyes, kidney, liver, heart or simply blood; only a bent of mind is needed. It is seen that the decision of an individual to donate his/her body for anatomical examination is a vital contribution towards the understanding and advancement of medical science. A donated body can be used for a number of possible purposes including teaching of the structure and function of the human body to students or healthcare professionals (human anatomy); scientific studies which improve the understanding of the human body (research) and learning surgical techniques etc. The execution of body donation should be considered as a gift of life and the ultimate fulfilment of one's own life. It is the supreme and ultimate to those who wish to be useful to the humankind.

The medical students as well as the other medical professionals have to change their approaches towards the body donation. We have to actively involve in the body donation programmed by organizing different awareness campaigns among common people. One should start the campaign from his or her own only, which will encourage the other people. Moreover, we should pay proper respect to the cadaver as well as to their relatives, which will encourage people to come forward for donating their body.

The Government and medical institutions should encourage and promote voluntary donation of dead bodies. Body donation is a way to express gratitude to medical science and health care.

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"We declare that this work was done by the author (s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors".

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REVIEW PAPER

Evidence-Based Practice – A Challenge For Nurses

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ABSTRACT

Evidence based practice, evidence based nursing and evidence based medicine are not new terminology in the recent era. During the 1980s, the term “evidence-based medicine” emerged to describe the approach that used scientific evidence to determine the best practice. Later, the term shifted to become “evidence-based practice” (EBP) as clinicians other than physicians recognized the importance of scientific evidence in clinical decision-making. For implementation of evidence based nursing practice, only knowledge is not sufficient among the nurses but they must have attitude and intention to practice it by their heart. In current Indian scenario, there are plenty of challenges for integrated evidence based nursing practice. Barriers to effective implementation of EBP may include factors like time, limited access to the literature, lack of confidence in the staff's ability to critically evaluate empirical research, limited interest in scientific inquiry, a work environment that does not support or value EBP, inadequate research resources, and limited authority or power to change practice based on research findings. The essential step to be successful in implementing EBP is, motivation to practice EBP among nursing staff at all levels. Nurse administrators, clinical nursing staff, advanced practice nurses, and interested nursing staff must work together to decide on how to involve entire nursing staff in implement EBP.

Key Words: Evidence based nursing practice, Barrier, strategy

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INTRODUCTION

Evidence-based practice has gained momentum in nursing, and its definitions vary widely. Research findings, knowledge from basic science, clinical knowledge, and expert opinion are all considered “evidence”; however, practices based on research findings are more likely to result in the desired patient outcomes across various settings and geographic location.¹

The call for evidence-based quality improvement and healthcare transformation underscores the need for redesigning care that is effective, safe, and efficient. There is always and will always be a desire to improve the care of our patients. There is a definite need for nurses, and all practitioners, to have an open mind when dealing with the modern inventions of the future because these could potentially improve the health of patients.

Nursing has a strong tradition of focusing on various ways of knowing to provide excellent care. All these ways of acquiring, processing, reflecting, and evaluating nursing knowledge are important in developing a comprehensive clinical perspective. Evidence-based practice explores the empiric way of knowing, focusing on methods of critically appraising and applying available data and research to understand and inform clinical decision-making better.²

Definitions of Evidence Based Practice (EBP)

Sackett et al.³ define EBP as ‘the conscientious, explicit and judicious use of current best evidence in making nursing decisions about the care of individual patients’. Their definition acknowledges that nurses should use the best evidence available; use the most current version of that evidence; but apply it judiciously in the context of

individual patient care.

Carnwell⁴ defines EBP as '[the] systematic search for, and appraisal of, best evidence in order to make clinical decisions that might require changes in current practice, while taking into account the individual needs of the patient.'

She also adds 'Best evidence might be defined as that which is valid and relevant to the patient.'

Her definition acknowledges the requirement to consider patient needs and that the nurse needs to be able to both search for and appraise evidence in order to make sound clinical decisions. She further adds that evidence must be valid and relevant to the individual patient.

It may be therefore, necessary to review a number of definitions related to EBP in order to establish how evidence may be viewed in different ways.

Evidence-Based NursingPractice (EBNP)

Over the past decade, in accordance with most health-related professions, there has been a growing focus on quality improvement including moving from a traditional intuition based paradigm to evidence-based nursing practice (EBNP).⁵ EBNP refers to the application of the best evidence in clinical decision-making by integrating clinical expertise with recent research findings, while taking into consideration the values and preferences of patients.⁶ EBNP is derived from the general movement toward evidence-based medicine in general healthcare⁷ and has had a profound impact on several disciplines, such as medicine,⁸ and mental health,⁹ and behavioural healthcare.¹⁰

Importance of evidence-based nursing practice

Implementing EBNP is potentially beneficial for patients and healthcare systems, and for nurses. It enhances patients' access to and information about effective treatment.¹¹ EBNP can improve the healthcare system by facilitating consistent decision making and advancing cost-effectiveness.¹²

Finally, EBNP can help nurses by facilitating informed and evidence-based clinical decision-making, helping them to keep updated with technologies, and enabling greater efficiency.¹³

These new competencies, in turn, can raise nurses' status in multi-professional teams and the profession in general. Nurses who are involved in EBNP have been found to express a sense of professionalism and growth, which contributes to their professional identity.¹⁴

Evidence-based practice helps nurses provide high-quality patient care based on research and knowledge rather than because "this is the way we have always done it," or based on traditions, myths, hunches, advice of colleagues, or outdated text books.

It also provides opportunities for nursing care to be more individualized, more effective, streamlined, and dynamic, and to maximize effects of clinical judgment. When evidence is used to define best practices rather than to support existing practices, nursing care keeps pace with the latest technological advances and takes advantage of new knowledge developments.

Implementation of Evidence Based Nursing Practice

Nurses face a real challenge when translating best evidence into clinical practice. The use of evidence based practice depends on the nurses' proficiency in understanding and critiquing the research articles and the associated literature which will be presented to them in the clinical setting.

The seven critical steps of Evidence Based Practice process¹⁵



Figure 1 The Evidence Based Practice process

Cultivate Spirit of Inquiry: A spirit of inquiry refers to an attitude in which questions are encouraged to be asked about existing practices. Cultivating a spirit of inquiry allows nurses to feel comfortable with questioning current methods of practice and challenging these practices to create improvements and change. A culture that fosters this should have a philosophy that incorporates EBP, access to tools that can enhance EBP and administrative support and leadership that values EBP.

Asking Clinical Question: Clinical questions may be address the Patient population, Issue or intervention, Comparison group, Outcome, and Time frame **or** in short form **PICOT**. Asking questions in this format assists in generating a search that produces the most relevant, quality information related to a topic, while also decreasing the amount of time needed to produce these search results.

Searching for and Collecting Relevant Evidence: To begin the search for evidence, nurses should use each keyword from the PICOT question that was formed. Once results have been found on the intervention or treatment, the research can be rated to determine which provides the strongest level of evidence. There are seven levels of evidence, with a level I being of the strongest quality and a level VII being of the weakest quality. The seven level of evidence are

Level I: Evidence from systematic reviews of randomized control trials.

Level II: Evidence from well-designed randomized control trials.

Level III: Evidence from well-designed control trials that are not randomized.

Level IV: Evidence from case-control or cohort studies.

Level V: Evidence from systematic reviews of descriptive or qualitative studies.

Level VI: Evidence from a single descriptive or qualitative study.

Level VII: Evidence from expert opinions.

The strongest levels of evidence, systematic reviews or meta-analyses, summarize evidence related to a specific topic by finding and assessing studies that specifically relate to the question being asked. Meta-analyses are systematic reviews that also use quantitative measures such as statistics to summarize the results of the studies analyzed.

Critically Appraise the Evidence: To begin the critical appraisal process, three questions may be asked to determine the validity, reliability, and applicability of the evidence found. The three questions are:

1. Are the results of the study valid? In order to be valid, the results of the study must be as close to the truth as possible. Also, the study must be conducted using best available research methods.
2. What are the results? This question measures the reliability of the study. In an intervention study, reliability consists of whether the intervention worked, how large the effect was, and whether a nurse could repeat the study with similar results. For a qualitative study, reliability would be measured by determining if the research accomplished the purpose of the study.
3. Will the results be applicable in caring for patients? The study may be used in practice. While caring for patients if the subjects are similar to the patients being cared for, the benefit outweighs the harm, the study is feasible, and the patient desires the treatment.

After asking these three questions, evidence appraisal continues by creating an evidence synthesis. This synthesis compares multiple studies to see if they are in agreement with each other.

Integrate the Evidence: After appraising the evidence, it is necessary to integrate it with the provider's expertise and patient's preferences. The patient is encouraged to practice autonomy and participate in the decision-making process.

Evaluate Outcomes: The next step in the evidence-based practice process is to evaluate whether the nursing intervention was effective in terms of patient outcomes. It is important to evaluate the outcomes in a real-world clinical setting to determine the impact of the evidence-based change on healthcare quality.

Disseminate Outcomes: The last step is to share the information especially if positive outcomes are achieved. By sharing the results of evidence-based practice process, others may benefit. Some methods to disseminate the information include presentations at conferences, rounds within one's own institution, and journal publications.

Barriers in Implementation of Evidence-Based Practice

Barriers to effective implementation of EBP may include many factors such as time factors, limited access to the literature, lack of confidence in the staff's ability to critically evaluate empirical research, limited interest in scientific inquiry, a work environment that does not support or value EBP, inadequate research resources, and limited authority or power to change practice based on research findings.

The barriers are *lack of knowledge on research process and lack of knowledge on Evidence- Based Practice* is two main barriers in which are observed in Indian scenario. The first of which would be the practitioner's ability to critically appraise research. This includes having a considerable amount of research evaluation skills, access to journals, and clinic/hospital support to spend time on EBN. The causes of these barriers include nurses and other professional practitioners' lack of knowledge of research methods, lack of support from professional colleagues and organizations, and lack of confidence and authority in the research arena.³

Lack of time during their shift is another primary challenge to do research and apply EBP. Also, there is an ongoing explosion in the amount and type of information available. Time, workload pressures, and competing priorities can impede research and development.¹⁶

Another barrier is that *the practice environment can be resistant* to changing tried and true conventional methods of practice. This may be because of reluctance to believe results of research study over safe, traditional practices, cost of adopting new practices, or gaining momentum to rewrite existing protocols.¹⁷

Lack of continuing education programs for the nurses is another barrier in implementing EBN into practice. For Practices there may not be provision for ongoing workshop to teach new skills which is due to lack of funding, staff, and time.

Another barrier in introducing newly learned methods for improving treatments or patients' health is the *fear of "stepping on one's toes"*. New nurses might feel it is not their place to suggest or even tell a superior nurse that newer, more efficient methods and/or practices are

available.

Strategies to promote evidence-based

The greatest barrier to nurses accessing and reviewing evidence based information related to time and the availability of information and identifying the implications for practice are of concern. Therefore any strategies to promote evidence based practice should be taken an account of the current constraints under which nurses are working and ensures that evidence based information is readily available to nurses in a form in which they can easily understand the implication for their practice.

Values, resources and evidence are the three factors that influence decision-making with regard to health care¹⁸. All registered nurses should be taught to read and critically interpret research and know where to find articles which relate to their field of care. In addition, nurses need to be more aware of how to assess the information and determine its applicability to their practice.

Nurses should be access to a rich library with nursing and medical journals. They also should be provided with the opportunities for working with a computer and for searching the Internet in the workplace. There should be system support for searching and reading professional literature. Support them to acquire the skills needed to read, evaluate and critically appraise evidence. Nurse Managers act as role models should provide the resources and the support for the work and celebrate success with recognition of unit staff. Involve the clinical educator as a part of the support system of the EBP change.

Bridging the gap from research to clinical practice can be accomplished by multiple means. One of the most common is incorporating evidence-based research into an organization's policies and procedures. However, several operational issues arise.

CONCLUSION

The evolution of EBP continues. The involvement of nurses in designing and implementing EBP is of paramount importance. From nursing assessment till the evaluation, from the admission to discharge of patients, from simple to complex work in every area of nursing EBP has a role. Nurses face a real challenge when translating best evidence into clinical practice. Therefore there is a need to improve access to libraries, computers

and Internet to facilitate evidence-based nursing practice. There is also a need to increase organizational support and incentives for implementing evidence-based nursing practice.

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ORIGINAL PAPER

Crimes Against Women: Analyzing Ground Realities in India-A Comparative Study

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ABSTRACT

In time long past, women took a high position of deference in the Indian society as observed in the Rig-Veda and other scriptures of India. In due course of time, because of social, political and economic diversion, women lost their respect and were relegated to the backdrop.

The trends of crime in India keep changing with the growing population and rapid development of towns and cities. A total of 2,44,270 incidents of crime against women were reported in the country during the year 2012 as compared to 2,28,650 in the year 2011 recording an increase of 6.4% during the year 2012. These crimes have continuously increased during 2008 to 2012 with 1,95,857 cases in the year 2008, 2,03,804 cases in 2009 and 2,13,585 cases in 2010.

Though the different laws are reviewed, amended and enacted to combat those heinous crimes against women, the cultural mindset about women are to be changed amongst the people of the society.

Key Words: Violence, Crime, Women, Rape and NCRB

INTRODUCTION

Rise in crime in any place is a worrying factor for everyone and especially crime against women (**CAW**), children and weaker sections of the society. It leaves deep scars in the society; therefore we need to study the causes, patterns and nature of crimes affecting the human being to find out the reasons of such crimes.¹

In common parlance, **sexual offence** constitutes the most shocking crime against conscience and morality. The sufferings of a girl abducted, molested or raped far excel than that of the man committing it. It is the depraved passion and uncontrolled sex urges seeking gratification through force or fraud against the natural law of mating by mutual consent and as per accepted legal and social principles, that constitutes the root cause of almost every sexual offences.²

The rape and murder of two teenaged sisters in Budaun and a minor in Bangalore; rape at gunpoint in Mumbai; an attempt to rape a judge in Aligarh; molestation followed by murder of an women in front of her children in Meghalaya are the rising incidents of crime against women have caused outrage not just in India, but across the world.³

The various crimes against women under the Indian Penal Code (IPC) are rape (Sec. 376 IPC); kidnapping and abduction for specified purposes (Sec. 363-373 IPC); homicide for dowry, dowry deaths or their attempts (Sec. 302/304-B IPC); torture both mental and physical (Sec. 498-A IPC); assault on women with intent to outrage her modesty (Sec. 354 IPC); insult to the modesty of women (Sec. 509 IPC) and importation of girl from foreign

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country up to 21 years of age (Sec. 366-B IPC).

The WHO, in its research on Violence against Women (VAW), categorized it as occurring through five stages of the life cycle: "1) pre-birth, 2) infancy, 3) girlhood, 4) adolescence and adulthood and 5) elderly".⁴

Although, all laws are not gender specific, the provisions of law affecting women significantly have been reviewed periodically and amendments are carried out to keep pace with the emerging requirements. The gender specific laws for which crime statistics are covered throughout the country are known as the crimes under the special and local laws (SLL) and they are: Immoral Traffic (Prevention) Act 1956, Dowry Prohibition Act, 1961, Indecent Representation of Women (Prohibition) Act, 1986 and Commission of Sati Prevention Act, 1987.

Although women may be the victims of any of the general crimes such as 'murder', 'cheating', etc., only the crimes that are directed specially against women are called **crimes against women**.⁵ Violence against women and girls is a problem of pandemic proportions. At least one out of every three women around the world has been beaten, forced into sex, or otherwise abused in her lifetime with the abuser usually someone known to her.⁶

In this paper ground realities in India are analyzed and important conclusions are sketched for a proactive medico legal approach.

MATERIAL AND METHODS

Different data has been collected from books, journals, newspapers, NCRB (**National Crime Records Bureau**) and CID, police station, etc., for the period mainly from 2008 to 2012. The data thus collected were compared and important conclusions were drawn for analyzing ground realities in India.

DISCUSSION

REPORTED INCIDENTS OF CRIME COMMITTED AGAINST WOMEN

A total of 2,44,270 incidents of crime against women (both under IPC and SLL) were reported in the country during the year 2012 as compared to 2,28,650 in the year 2011 recording an increase of 6.4% during the year 2012. These crimes have continuously increased during 2008 to 2012 with 1,95,857 cases in the year 2008, 2,03,804 cases in 2009 and 2,13,585 cases in 2010 (**Table 1**).⁵

Table 1 Incidence and rate of CAW during last five years

| Year | Crime registered under IPC | Incidence of CAW | Percentage of CAW |
|------|----------------------------|------------------|-------------------|
| 2008 | 2093379 | 195857 | 9.36 |
| 2009 | 2121345 | 203804 | 9.61 |
| 2010 | 2224831 | 213585 | 9.60 |
| 2011 | 2325575 | 228650 | 9.83 |
| 2012 | 2387188 | 244270 | 10.23 |

CRIME RATE

The rate of crime committed against women is shown in **Table 2**.

Table 2 Rate of Cognizable CAW⁵

| Sl. No | Incidence of CAW | Female population in lakhs | Rate of cognizable CAW |
|--------|------------------|----------------------------|------------------------|
| 2011 | 228650 | 1210193 | 18.9 |
| 2012 | 244270 | 5851.89 | 41.74 |

Assam has reported the highest rate of CAW at 89.5 during the year 2012 as compared to 41.7, crime rate at the national level.⁵

TREND ANALYSIS OF CAW

The details of trend of crime against women from 2008 to 2012 with percentage of variation are shown in **Table 3**.

Table 3 Crime head-wise incidents from 2008-2012 and % of variation⁵

| Crime Head | Year | | | | | % Variation in 2012 over 2011 |
|--|----------------|----------------|----------------|----------------|----------------|-------------------------------------|
| | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Rape (Sec. 376 IPC) | 21,467 | 21,397 | 22,172 | 24,206 | 24,923 | 3 |
| Kidnapping & abduction (Sec.363 to 373 IPC) | 22,939 | 25,741 | 29,795 | 35,565 | 38,262 | 7.6 |
| Dowry death (Sec. 302/304 IPC) | 8,172 | 8,383 | 8,391 | 8,618 | 8,233 | -4.5 |
| Cruelty by husband and relatives (Sec. 498-A IPC) | 81,344 | 89,546 | 94,041 | 99,135 | 106,527 | 7.5 |
| Assault on women with intent to Outrage her modesty (Sec. 354 IPC) | 40,413 | 38,711 | 40,613 | 42,968 | 45,351 | 5.5 |
| Insult to the Modesty of women (Sec. 509 IPC) | 12,214 | 11,009 | 9,961 | 8,570 | 9,173 | 7.0 |
| Importation of girl from foreign Country (Sec. 366-B IPC) | 67 | 48 | 36 | 80 | 59 | -26.3 |
| Total IPC crime against women | 186,616 | 194,835 | 205,009 | 219,142 | 232,528 | 6.1 |
| Commission of Sati Prevention Act, 1987 | 1 | 0 | 0 | 1 | 0 | -100 |
| Immoral Traffic (Prevention) Act, 1956 | 2,659 | 2,474 | 2,499 | 2,435 | 2,563 | 5.3 |
| Indecent Representation of Women (Prohibition) Act, 1986 | 1,025 | 845 | 895 | 453 | 141 | -68.9 |
| Dowry Prohibition Act, 1961 | 5,555 | 5,650 | 5,182 | 6,619 | 9,038 | 36.5 |
| Total SLL crime against women | 9,240 | 8,969 | 8,576 | 9,508 | 11,742 | 23.5 |
| Total (A+B) | 195,856 | 203,804 | 213,585 | 228,650 | 244,270 | 6.8 |

The CAW during the year 2012 has increased by 6.8% over the year 2011 and by 24.7% over the year 2008. The IPC component of CAW has accounted for 95.2% of total crimes and the rest 4.8% were SLL crimes against women.

The proportion of IPC crimes committed against women towards total IPC crimes has increased during last 5 years from 8.9% in the year 2008 to 10.2% during the year 2012 (**Table 4**).

Table 4 Proportion of IPC of CAW towards total IPC crimes

| Year | Total IPC crimes | CAW (IPC cases) | % of total IPC crimes |
|------|------------------|-----------------|--------------------------|
| 2008 | 20,93,379 | 1,86,617 | 8.9 |
| 2009 | 21,21,345 | 2,03,804 | 9.2 |
| 2010 | 22,24,831 | 2,13,585 | 9.6 |
| 2011 | 23,25,575 | 2,19,142 | 9.4 |
| 2012 | 23,87,188 | 2,44,270 | 10.2 |

CRIME HEAD-WISE ANALYSIS

Rape (Sec. 376 IPC): A decreasing trend in rape cases during the year 2003, 2008 to 2009 with an increasing trend of it has been observed from 2009 to 2012 (**Table 5**).⁵

Madhya Pradesh has reported highest number of rape cases (3,425) accounting for 13.7% of total such cases reported in the country. Mizoram has reported the highest crime rate of 20.8 as compared to national average of 4.3. Rape cases have been further categorized as incest rape and other rape cases.

Table 5 Incidence of CAW during Last 12 Years

| Year | CAW | Incidence of rape (Sec. 376 IPC) cases | % of rape cases |
|------|--------|---|-----------------|
| 2001 | 143795 | 16075 | 11.18 |
| 2002 | 143034 | 16373 | 11.44 |
| 2003 | 140601 | 15847 | 11.27 |
| 2004 | 154333 | 18233 | 11.81 |
| 2005 | 155553 | 18359 | 11.80 |
| 2006 | 164765 | 19348 | 11.74 |
| 2007 | 185312 | 20737 | 11.19 |
| 2008 | 195857 | 21467 | 10.96 |
| 2009 | 203804 | 21397 | 10.49 |
| 2010 | 213585 | 22172 | 10.38 |
| 2011 | 228650 | 24206 | 10.58 |
| 2012 | 244270 | 24923 | 10.20 |

Incest Rape: Incest rape cases have increased by 46.8% from 267 cases in 2011 to 392 cases in 2012 as compared to 3.0% increase in overall rape cases. Maharashtra (77 cases) has accounted for the highest (19.6%) of the total such cases reported in the country.⁵

Rape Victims: Amid empty talk of 'empowerment of women' rapes have become a routine affair with girl-children or teenagers being regularly targeted in every city, town or rural area. It is as if wolves have been set on the second-sex feticide to outright killing.⁷

There were 24,915 victims of rape out of 24,923 reported rape cases in the country during the year 2012. 12.5% (3,125) of the total victims of rape were girl under 14 years of age, while 23.9% (5,957 victims) were teenage girl (14-18 years). 50.2% (12,511 victims) were women in the age group 18-30 years. However, 12.8% (3,187 victims) were in the age group of 30-50 years while 0.05% (135 victims) was over 50 years of age (**Table 6**).⁵

Table 6 Incidence of rape cases (Sec. 376 IPC) during last 12 years

| Year | Cases under IPC | Rape cases | % of rape cases |
|------|-----------------|------------|-----------------|
| 2001 | 1769308 | 16075 | 0.91 |
| 2002 | 1780390 | 16373 | 0.92 |
| 2003 | 1716120 | 15847 | 0.92 |
| 2004 | 1832015 | 18233 | 0.99 |
| 2005 | 1822602 | 18359 | 1 |
| 2006 | 1878293 | 19348 | 1.73 |
| 2007 | 1989673 | 20737 | 1.04 |
| 2008 | 2093379 | 21467 | 1.02 |
| 2009 | 2121345 | 21397 | 1.01 |
| 2010 | 2224831 | 22172 | 0.99 |
| 2011 | 2325575 | 24206 | 1.04 |
| 2012 | 2387188 | 24923 | 1.04 |

Offenders: The various data also tell us that the victims in as knew the offenders as many as in 24,470 (98.2%) cases. Parents/close family members were involved in 1.6% (393 out of 24,470), neighbors in 34.7% (8,484 out of 24,470) and relatives in 6.5% (1,585 out of 24,470) cases.

Kidnapping and Abduction (Sec. 363-373 IPC): These cases have reported an increase of 7.6% during the year 2012 as compared to previous year. Uttar Pradesh with 7,910 cases has accounted for 22.2% of the total cases at the national level. Delhi reported the highest crime rate at 25.3 as compared to the national average of 6.5.⁷ Who is doing the same in our country which was recently bracketed by the United Nations as the top two nations recording majority of "117 million is missing girls" in Asia?

Dowry Deaths (Sec. 302, 304B IPC): There are lakhs of instances where rich parents of daughters have paid cores of rupees succumbing to the 'black mail' of in-laws or that of the husband but did not have the courage to bring their daughters back home. The end result in a majority of such cases is no secret daughters are done to death by in-laws lusting for more money.⁷

The cases of dowry deaths have decreased by 4.5% during the year 2012 over the previous year (8,618 cases). 27.3% (2,244) of the total such cases reported from Uttar Pradesh alone followed by Bihar for 15.5% (1,275) cases. The highest rate of crime (2.7) was reported from Bihar as compared to the national average of 1.4.

Torture (Cruelty by husband or his relatives) (Sec. 498-A IPC): Torture cases in the country have increased by 7.5% during the year 2012 over the previous year (99,135 cases). 18.7% of these cases were reported from West Bengal (19,865) followed by Andhra Pradesh for 12.6% (13,389) and Rajasthan for 12.5% (13,312). The highest crime rate of 47.8 was reported from Tripura as compared to the national rate at 18.2.

Assault on Women with intent to Outrage her Modesty (Sec. 354 IPC): If on the one hand it is uninterrupted 'honour killing' against girls seeking to assert their independence in their personal lives, on the other it is the wanton outrage of modesty with no counter-action from the state or the society at large.⁷

Incidence of assault on women with intends to outrage her modesty in the country have increased by 5.5% during the year 2012 over the previous year (42,968). Madhya Pradesh has reported the highest incidence (6,655) amounting to 14.7% of total such incidences. Kerala has reported the highest crime rate (20.9) as compared to the National average of 7.7.

Insult to the Modesty of Women (Sec. 509 IPC): Incidence increased by 7% during the year 2012 over 2011. Andhra Pradesh has reported 40.5% followed by Maharashtra 14.1%. Andhra Pradesh has reported the highest crime rate (8.7) as compared to the national average of 1.6.

Importation of Girl from Foreign Country (Sec. 366-B IPC): A decrease of 26.2% has been observed in crime head as 59 cases were reported during the year 2012 as compared to 80 cases in the previous year 2011. Karnataka stand for 32 cases heading top of the list, West Bengal for 12 cases have together contributed 93.2% of total such cases at the national level.

Immoral Traffic (Prevention Act, 1956): 5.2% increased by 2012 over 2011. The highest incidences of 19.5% were reported from Tamil Nadu followed by Andhra Pradesh 18.4%. Goa has reported the highest crime rate of 4.6 as compared to the national average of 0.2.

Commission of Sati Prevention Act, 1987: No such case was registered under this crime head in across the country during the year 2012.

Indecent Representation of Women (Prohibition Act, 1986): A decrease of 68.9% was noticed in 2012 as compared 2011. Rajasthan with 62 cases has accounted for 44% of total such cases with highest crime rate of 0.2.⁵

Dowry Prohibition Act: The cases under this act have increased by 36.5% during the year 2012 as compared to the previous year (6,619). 27.8% of cases were reported from Andhra Pradesh (2,511) followed by Odisha (1,487) accounting for 16.5% of total cases at the national level. The highest crime rate of 7.3 was reported from Odisha as compared to 1.5 at the national level.⁵

Acid Throwing: Also called acid attack, or vitriolage.⁸ Women and girls are the victims in 75-80%

of cases.⁹ Acid attacks are often connected to domestic disputes, including dowry disputes, and refusal of a proposition for marriage, or of sexual advances.

India passed a new law in February 2014 following the Delhi gang rape case which also criminalizes acid attacks. The law defines acid attack as a separate Indian Penal Code offence and proposes punishment of not less than 10 years to a maximum of life imprisonment for perpetrators and fine that could go up to Rs. 10 lakhs. The Supreme Court on 18 July, 2013 passed the order to regulate the sale of acids across the country. The decision was taken in the light of a PIL which was filed in 2006 by Laxmi, an acid attack victim from Delhi.¹⁰

CONCLUSION

A steep decline in the quality of governance, proportionate rise in public inertia and self-centered attitude of the public has made matters worse for women, particularly from the Dalit segment which remains most vulnerable against muscle, money and political powers of the intermediate caste with dominant feudal tendencies.⁷ The cultural mindsets about women are to be changed amongst the common people of the society. Some rights-based law like "Protection of Women against Domestic Violence Act 2005", the JAGORI's vision, "Bringing feminist consciousness to a wider audience using creative media", "men's role in stopping discrimination against women at a personal level", "increased involvement of men in parenting", "increasing number of organizations of men against violence", community-level initiatives to prevent violence: gender sensitization workshops with men and joint campaigns against violence against women are very much useful in combating those crimes. Increase in women's participation at all levels: social, economic and political; awareness of women's rights by the State, civil society organizations, as well as the public at large is to be carried out to reduce the incident of these heinous crimes against women.

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Dr. Prakashved Gupta, Demonstrator of Jorhat Medical College, Jorhat, Assam, India was awarded the Best Paper (PGT Section) at IAFM Conference "Forensic Medicon 2014" held at Guwahati Medical College, Assam in 2014

ORIGINAL PAPER

Suicide Among Adolescent and Young Adults

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ABSTRACT

Background: Suicide is an act of intentionally causing one's own death. It is a common cause of death among adolescents and youths in the current scenario of the World and presents a serious social and public health problem. That's the thought behind the present study to perform in our centre in order to highlight the current prevalence, pattern and risk factors of suicidal deaths in these subjects in Manipur and to formulate proper strategy and recommendation to limit the incidence.

Results: A total of 1879 medico-legal autopsies were conducted during the study period and 98 cases were suicidal deaths. Out of these suicidal deaths our study group consisted of 52 cases (2.76% of total medico-legal autopsies and 53.06% of the total suicidal deaths). Males out-numbered female in the ratio 2.47:1. Hanging was the commonest means of suicide (46.16%), occurred mostly inside the house (67.31%) and family problems (40.37%) are the major risk factor.

Conclusion: Rigorous evaluation of new and existing prevention programs is essential to identify and establish the most effective interventions for reducing suicide among young persons.

Key Words: Suicide, Adolescent, Youth, Hanging, Poisoning, Firearm injury

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INTRODUCTION

Suicide is the act of intentionally causing one's own death. Suicide is often carried out as a result of despair, the cause of which is frequently attributed to mental disorders, alcoholism or drug abuse, and broken family. The most commonly used method of suicide varies by country and is partly related to availability. Common methods include hanging, pesticide and firearms etc.

More than one lakh persons (1, 34,779) lost their lives by committing suicide in India during the year 2013. Tamil Nadu (12.3%), Maharashtra (12.3%), Andhra Pradesh (10.8%), West Bengal (9.7%) and Karnataka (8.4%) together contributed 53.5% of total suicide victims. Pondicherry and Sikkim have reported 35.6 and 29.3 suicidal deaths per one lakh of population respectively as against the national average of 11.0. Manipur have reported 1.5 suicidal deaths per one lakh population.¹This national data also have shown an increasing trend of suicidal deaths in most of the state including Manipur. The published data obtained from various countries as well as from India shown that incidence of suicide is highest amongst youths.^{2,3,4,5,6,7} These age group represent the most active and productive section of the society. Here comes the importance of conducting an observational study thoroughly to highlight the current prevalence of suicide among adolescent and young adults in Manipur and to formulate proper strategy and recommendation to limit the evil menace from the society.

METHODS

A retrospective observational study has been conducted in the Department of Forensic Medicine, Regional Institute of Medical Sciences, Imphal for a period of 5 years from January 2009 to 2013 December. Data were

collected from the medico-legal autopsy record book of the department. 52 cases of suicides amongst adolescent and young adults were documented and divided into three age groups i.e. 16-20, 21-25 and 26-30 years. Supportive evidence and histories were obtained from the relatives of the victim and investigating police officers and inquest reports. Data were analyzed with regard to incidence, sex, pattern and characteristic of suicide and different method used to commit suicide and accordingly presented in Tables.

OBSERVATION AND RESULTS

During the study period, a total of 1879 medico-legal autopsies were conducted in Department of Forensic Medicine, RIMS, Imphal and 98 cases were suicidal deaths. Out of these suicidal deaths our study group consisted of 52 cases (2.76%) of total medico-legal autopsies and 53.06% of the total suicidal deaths. As shown in **Table 1**, there is increasing trend of incidence from 2% to 4.3%. Maximum number of cases occurred in age group 21-25 years (40.38%) followed by age group 26-30 years (32.69%) as presented in **Table 2**.

Table 1 Year Wise Distribution

| Year wise | No. of ML autopsies (%) | Number of cases | Percentage |
|-----------|-------------------------|-----------------|------------|
| 2009 | 591 | 12 | 2.03 |
| 2010 | 364 | 7 | 1.92 |
| 2011 | 313 | 8 | 2.55 |
| 2012 | 310 | 10 | 3.23 |
| 2013 | 301 | 13 | 4.32 |
| Total | 1879 | 52 | 2.76 |

Table 3 Place of occurrence and means of suicide

| Place | Hanging | Poisoning | Firearm injury | Burns | Jumping from height | Stab injury | Total (%) |
|---------------|-------------|-------------|----------------|------------|---------------------|-------------|-------------|
| Inside house | 17 (32.69%) | 9 (17.31%) | 2 (3.85%) | 5 (9.62%) | 1 (1.92%) | 1 (1.92%) | 35 (67.31%) |
| Working place | 0 | 0 | 4 | 0 | 0 | 0 | 4(7.69%) |
| Field/ Jungle | 4 (7.69%) | 1 (1.92%) | 2 | 0 | 0 | 0 | 7(13.47%) |
| Courtyard | 3 (3.85%) | 1 (1.92%) | 1 (1.92%) | 1 (1.92%) | 0 | 0 | 6(11.53%) |
| Total | 24 (46.16%) | 11 (21.15%) | 9 (17.31%) | 6 (11.54%) | 1(1.92%) | 1(1.92%) | 52 (100%) |

In the present study, male outnumbered the female with a ratio of 2.47: 1(M=37, F=15). Maximum number of incidence occurred amongst Meitei community (53.84%). Lower socio-economic status (46.15%) and people with secondary level of education (48.08%) had maximum number of cases. As presented in Table-3, most preferred means of suicide was hanging (46.16%) followed by poisoning (21.15%) and firearm injury (17.31%). The victims of suicidal firearm fatalities were all security persons. Suicides by jumping from height and by stabbing were least common comprising of 1.92% each. In the present series of suicidal deaths, 35(67.31%) cases preferred their house whereas 17(32.69%) were found to have preferred places outside their houses for self destruction as depicted in **Table 3**.

Table 2 Age wise distribution of cases

| Age wise(Years) | Number of cases | Percentage (%) |
|-----------------|-----------------|----------------|
| 14-18 | 14 | 26.92 |
| 19-26 | 21 | 40.38 |
| 27-30 | 17 | 32.69 |
| Total | 52 | 100% |

Table 4 Predisposing factors

| Factors | Number of cases | Percentage |
|-------------------------------|-----------------|------------|
| Family problems | 21 | 40.37 |
| Mental illness | 7 | 13.47 |
| Disappointment in Love affair | 6 | 11.54 |
| Drug addicts | 6 | 11.54 |
| Financial issue | 4 | 7.69 |
| Unemployment | 3 | 5.77 |
| Failure in examination | 2 | 3.85 |
| Dispute with superior | 1 | 1.92 |
| Not known | 2 | 3.85 |
| Total | 52 | 100% |

Incidence of family problems (40.37%) as a precipitating factor is the highest, followed by mental illness (13.47%), disappointment in love affairs (11.54%) and drug addiction (11.54%) as shown above in **Table 4**. It was also found that maximum number of suicidal deaths occurred in summer months (28.85%) followed by spring (26.93%) and least cases were reported in winter months (19.22%). In the present study, maximum number of suicides occurred during 12 noon to 6pm (42.30%). As presented in Table -5, it was found that out of 52 cases of suicide 38 cases (73.09%) died on the spot, 11 cases (21.15%) survived for less than 6 hours and only one case survived for more than 7 days which was a case of burn. Most of the spot deaths were due to hanging 22 cases (42.32%).

Table 5 Period of Survival

| Methods of Suicide | Survival Time | | | | | | |
|------------------------|-------------------|-------------------|-----------------|-----------------|----------|----------|-----------------|
| | On the spot | <6 Hrs | 6-12 Hrs | 12-24 Hrs | 2-3 days | 3-7 days | >7 days |
| Hanging (24) | 22(42.32%) | 2 (3.85%) | 0 | 0 | 0 | 0 | 0 |
| Poisoning(11) | 6(11.54%) | 4(7.69%) | 1(1.92%) | 0 | 0 | 0 | 0 |
| Firearm injury(9) | 7(13.47%) | 2(3.85%) | 0 | 0 | 0 | 0 | 0 |
| Burn(6) | 3(5.76%) | 1(1.92%) | 0 | 1(1.92%) | 0 | 0 | 1(1.92%) |
| Jumping from height(1) | 0 | 1(1.92%) | 0 | 0 | 0 | 0 | 0 |
| Stab wound(1) | 0 | 1(1.92%) | 0 | 0 | 0 | 0 | 0 |
| Total (52) | 38(73.09%) | 11(21.15%) | 1(1.92%) | 1(1.92%) | 0 | 0 | 1(1.92%) |

DISCUSSION

Suicide is the result of an act deliberately initiated and performed by a person in the full knowledge or expectation of its fatal outcome. In the present study, it was observed that out of total 1879 cases of medicolegal autopsies conducted, 52 cases (2.76%) were suicidal deaths among adolescent and young age group comprising of 53.06% of total number of suicides during the study period. This finding is in agreement with the study conducted by several authors.^{2,8} Highest incidence in youth is due to the fact that this particular age group is the most active group and instead of facing defeat, they might have preferred to end their life.

In this study, males out-numbered the females in the ratio of 2.47:1. This is also in agreement with different studies.^{2,6} It might be due to aggressive nature, high unemployment, the ever increasing demand to run the family, financial instability among male. In the present series, the most common age group is 21-25 years with

40.38% which in accordance with the study observation by Johnson GR et al.⁹ and Moscicki EK et al.¹⁰

Majority of cases occurred inside the house and during summer months mainly followed by spring, autumn and winter and the preferred time being 12 noon to 6pm which is in accordance with the observation made by other author⁶.

It was found that the commonest means of suicide was hanging 24 cases (46.15%) followed by poisoning and firearm injury. The findings observed are in agreement with other studies⁶. Hanging as the most common means of suicide is in sharp contrast with other studies where poisoning is the method of choice.^{2,3,4,5,9} The reason of higher incidence of hanging could be because people generally believe that hanging is easy availability of materials needed for the act, simplicity of act, guaranteed fatality and belief of a prompt and painless death. Poisoning as a means is also common among adolescent age group staying in rural areas. Family problems which

lead to depression and anxiety and other mental illness are the major risks factor. Unemployment, disappointment in love affair, drug addiction etc. are other common factors of suicidal deaths among adolescents and young adults. These findings are in accordance with other authors.^{2,9}

CONCLUSION

Suicide rate is increasing and emerging as a major health problem worldwide. In addition to the tragedy of a life not lived, suicide has devastating consequences for the family and the community. According to recent development attempt to commit suicide is no more punishable under IPC. So, it can be regarded as public health problem and indirect indicator of mental health of the community. Suicide prevention is still a challenge and an accurate and population based study is a must to rule out all possible causes and reasons behind all fatalities among this vulnerable age group. More attention should be made from medical profession and the public health agencies as well. Primary care clinicians are key professionals in recognizing youth at risk for suicide.⁸ From the present study, it can be concluded that risk of suicide in Manipur is higher among the adolescents and youths who are facing the problem of first adverse social exposures, family problem, job insecurity, financial instability, frustration because of local law and order situation leading to severe stress. So serious deliberate thoughts and means of decreasing the evil menace or burden of stress should be given to the mass. Before taking up of the stringent act to commit suicide very often some hint or mention about the plans are directed to the friend, family or relatives. Learning about the warning signs and make use of it in favour of the adolescent is the first step in the prevention process. Those individual with high risks of suicide or attempted suicide should be consulted with a mental health professional immediately. The safest course of action is hospitalization, placing the individual in a safe and protected environment. Proper medical intervention and treatment are essential for stabilization and management of such cases.¹¹ Life styles need to be modified to reduce stress problem.

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ORIGINAL PAPER

Level of Parents' Satisfaction with the Nursing Care Received by their Hospitalized Children

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ABSTRACT

A cross sectional descriptive study was conducted in Paediatric medicine and surgery ward of Gauhati Medical College and Hospital, Guwahati to assess the level of satisfaction among parents' with the nursing care received by their child during hospitalization. A sample of 160 parents of 80 children was selected by purposive sampling technique. The tool used for the study was the structure interview schedule consists of socio demographic characteristics and three point satisfaction scales to assess the level of satisfaction of parents.

The result revealed that majority of the parents 55.6% were moderately satisfied, 26.3% were highly satisfied and only 18.1% were not satisfied at all. No significant difference was observed in the level of satisfaction between mother and father. The study also revealed that there was significant association between sex of the child ($\chi^2_{(2)} = 0.01, p < 0.05$), family income ($\chi^2_{(2)} = 0.03, p < 0.05$), dependency of the child on the basis of nursing care ($\chi^2_{(4)} = 0.00, p < 0.05$), duration of hospital stay ($\chi^2_{(4)} = 0.03, p < 0.05$), and place of residence ($\chi^2_{(2)} = 0.00, p < 0.05$) with satisfaction level of parents.

The findings of the study demonstrated that there is a need to increase the awareness among the nurses regarding satisfaction of parents with nursing care in children's ward to improve the quality of health care. The findings could be utilized as a basis for conducting in-service education programme for the nurses, so that they develop a constant awareness and a clear understanding of the care of children.

Key Words: Parents, hospitalized Children, Nursing care, level of satisfaction.

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INTRODUCTION AND BACKGROUND OF THE STUDY

Illness, with the occasional consequence of hospitalization, affects children and their families in a variety of ways. Hospitalization is often confusing, complex and overwhelming for both children and their families. Parents' reaction to illness and hospitalization of their child depends on variety of factors². Although one cannot predict which factors are most likely to influence their response. A number of variables have been identified like seriousness of the threat to the child, previous experience with illness or hospitalization, available support systems, personal ego strength, coping abilities, communication patterns among family members etc. Parents often experience many stressful situations with the hospitalization of their child which may affect their satisfaction and ability to interact with their child.^{3,4}

There has been increasingly interest in patients' satisfaction with nursing care is observed in the past few decades. Patients' satisfaction with nursing care is considered as an important factor in explaining patients' perceptions of service quality.⁵

Recent research has identified common factors among parents whose children were hospitalized, including feeling an overall sense of helplessness, questioning the skills of staff, dealing with fear, coping with uncertainty, and seeking reassurance from caregivers.⁶

Nurses are the important members of the health care team. Like any other set up, in pediatric set up also nursing care system has an important role

to play in providing care to the children. Support from nurses during their child's hospitalization can assist parents to maintain their parenting role and promote quality pediatric nursing care.⁷ Thus nurses along with parents contribute significantly towards the child care by involving parents in providing care to their children.

Studies on the satisfaction of parents related to nursing care received by their children are very few in the developing countries especially in India. Therefore investigator has chosen this study to generate a road map for further improvement in nursing care of hospitalized children and which will increase the overall satisfaction of parents. The findings of present study would identify the probable areas of nursing care to be developed furthermore to give quality care to patient.

OBJECTIVES

The present study attempted

1. To assess the level of satisfaction of parents' with the nursing care received by their child during hospitalization.
2. To compare the level of satisfaction between the mother and father of the hospitalized child.
3. To find out the association between level of parents' satisfaction with selected demographic variables (viz. age of the child, sex of the child, age of the parent, educational status, occupation, family income, dependency of the child on the basis of nursing care, duration of hospital stay, place of residence).

METHODOLOGY

Across sectional descriptive survey approach was used for the study. The Study was conducted in Pediatric medicine and Pediatric surgery ward of Gauhati Medical College and Hospital, Guwahati. The population consisted of parents whose children were hospitalised for at least 3 days or more. The sample size was 160 parents of 80 children which were selected by purposive sampling technique.

The tool used for data collection consists of the following:
Part 1: *Demographic characteristics*

Demographic characteristics includes age and sex of the child, age, educational status, occupation and family

income of the parent, dependency of the child on the basis of nursing care, duration of hospital stay and place of residence.

Part 2: *level of satisfaction of parents' related to different areas of nursing care to their hospitalized children*

Level of satisfaction of parents was determined by three point satisfaction rating scale related to fifteen areas of nursing care which was developed by the investigator and validity and reliability of tool was obtained. Each of these items has three responses with a scale value of 3, 2, and 1 respectively. The level of satisfaction was computed in terms of percentile and were graded as highly satisfied (Above 75th percentile) moderately satisfied (25th-75th percentile) and not satisfied respectively (Below 25th percentile).

ETHICAL CONSIDERATION

The study was performed after getting approval from the Institutional Ethical Committee of Regional College of Nursing, Guwahati. Permission was obtained from the concern authorities. Verbal and written consent was taken from the participants. Anonymity of the respondents was maintained by using a coded number instead of their name.

OBSERVATIONS AND RESULTS

All the items in the tools were coded and transferred to a master sheet for computer programming. Statistical analysis has been performed by using SPSS software version 20.0 to analyze the data. Frequency and percentage distribution was used to describe the demographic variables. The t-test was used to find the difference between the satisfaction level of mother and father. The Chi-square (χ^2) test was applied to determine the association between satisfaction level and the selected variables. Significance levels was fixed at 95% confidence intervals (p value <0.05).

DEMOGRAPHIC CHARACTERISTICS

Analysis of demographic data revealed that majority of children (48.8%) were in the age group 1month-3years followed by (21.25%) in the age group 10 years-12 years and above, (16.25%) in the age group 4 years-6 years and only 11 (13.75%) children were in the age group 7years-9 years.

Majority (66.25%) were male and (33.75%) were female children.

Majority (56.25%) fathers were in the age group 33-37 years and above. Whereas majority (28.8%) mothers were in the age group of 28-32 years.

In relation to education of mother majority (33.75%) were illiterate and rest of the mothers were middle school (31.25%), primary school (21.25%), had high school (6.25%), higher secondary level (5%) and (2.5%) were professional level of education.

In case of father majority had primary school (25.0%) followed by (18.8%) illiterate, (17.5) graduate, 13 (16.3%) higher secondary, (7.5%) high school, (5%) middle school

and very few have post graduate, professional and graduate level of education.

In relation to occupation of the father majority (38.0%) were in clerical job, shop owner, or farmer. Whereas in case of mother majority (76.3%) of them were house wife.

Majority of parents (36.3%) had total family income Rs.2936- Rs.4893.

Majority parents (67.5%) were from rural area.

In relation to dependency of the child on the basis of nursing care majority (66.3%) were partially dependent on nursing care.

Majority of parents (40.0%) were with their child during hospital for 3-7 days.

LEVEL OF SATISFACTION OF PARENTS' OF HOSPITALISED CHILDREN
n=160



Figure 1 Distribution of parents according to level of satisfaction

From **Figure 1** it is observed that majority (55.6%) were moderately satisfied, (26.3%) parents were highly satisfied and only (18.1%) were not satisfied at all with the nursing care.

Table 1 Distribution of mothers and fathers' according to their level of satisfaction

| Category of Parents | Highly Satisfied | | Moderately Satisfied | | Not Satisfied | |
|---------------------|------------------|------|----------------------|------|---------------|------|
| | No | (%) | No | (%) | No | (%) |
| Mother | 20 | 25 | 45 | 56.3 | 15 | 18.8 |
| Father | 22 | 27.5 | 44 | 55 | 14 | 17.5 |

From Table 1 it is interpreted that mothers (56.3%) and father (55%) were moderately satisfied. Whereas mothers (25.0%) and father (27.5%) were highly satisfied, and only (18.8%) mother and (17.5%) father were not satisfied at all.

Table 2 Mean, standard deviation standard errors and t- value of mothers and fathers level of satisfaction

| Category of parents | Mean | Standard Deviation | Standard Error of Mean | T-value | P-value |
|---------------------|--------|--------------------|------------------------|---------|---------|
| Mother | 142.18 | 14.76 | 1.65 | 0.407 | 0.684 |
| Father | 143.15 | 15.51 | 1.73 | | (>0.05) |

From the above table 2 it is observed that there is no significant difference in the level of satisfaction between mother and father of the hospitalized child ($t=0.407$ for $df 158$) as p value= 0.684 which is >0.05 . Therefore it may be inferred that satisfaction level between father and mother is same.

Table 3 Distribution of parents according to their level of satisfaction with different areas of nursing care (n=160)

| Nursing care | Highly Satisfied | | Moderately Satisfied | | Not Satisfied | |
|---|------------------|-------|----------------------|------|---------------|-------|
| | No | (%) | No | (%) | No | (%) |
| Admission and orientation in the pediatric wards. | 37 | 23.1 | 89 | 55.6 | 34 | 21.3 |
| Comfort, rest and sleep | 35 | 21.9 | 95 | 59.4 | 30 | 18.8 |
| Hygienic needs | 24 | 15.0 | 102 | 63.8 | 34 | 21.3 |
| Environment | 0 | 0 | 127 | 79.4 | 33 | 20.6 |
| Administration of medication | 39 | 24.4 | 98 | 61.3 | 23 | 14.4 |
| Investigation, other procedure | 34 | 21.3 | 92 | 57.5 | 34 | 21.3 |
| Nutritional needs | 26 | 16.3 | 102 | 63.8 | 32 | 20.0 |
| Psychological support | 0 | 0 | 135 | 84.4 | 25 | 15.6 |
| Safety and security | 17 | 10.6 | 104 | 65.0 | 39 | 24.4 |
| Elimination | 22 | 13.8 | 109 | 68.1 | 29 | 18.10 |
| Observation | 0 | 0 | 131 | 81.9 | 29 | 18.0 |
| Participation | 21 | 13.1 | 126 | 78.8 | 13 | 8.1 |
| Play and activity | 28 | 17.50 | 131 | 81.9 | 1 | 0.6 |
| Communication | 40 | 25.0 | 92 | 57.5 | 28 | 17.5 |
| Health education | 28 | 17.5 | 132 | 82.5 | 0 | 0 |

From **Table 3** it is interpreted that majority of parents (84.4%) were moderately satisfied with psychological support, observation and play activity (81.9) whereas (25.0%) were highly satisfied with the communication of nurses. Majority (24.4%) were not satisfied with safety and security provided by the nurse to their children. Therefore it may be concluded that nurses working in the paediatric ward need to improve skill in providing nursing care.

Table 4 Association between level of parents' satisfaction and selected demographic variables.

| Demographic variables | Sample | Chi-square | Significance (p-value) |
|--|----------|------------|------------------------|
| Age | Children | 8.20 | 0.22 |
| Sex | Children | 8.96 | 0.01* |
| Age | Parents | 4.91 | 0.56 |
| Educational status | Parents | 15.11 | 0.52 |
| Occupation | Parents | 12.55 | 0.25 |
| Family income | Parents | 22.28 | 0.03* |
| Dependency of the child on the basis of nursing care | Parents | 15.63 | 0.00* |
| Place of residence | Parents | 9.53 | 0.00* |

*P value significant at <0.05

From the table 4 it is clear that sex of the child ($\chi^2_{(2)} = 8.96$, $p<0.05$), total family income ($\chi^2_{(12)} = 22.28$, $p<0.05$), dependency of the child on the basis of nursing care ($\chi^2_{(2)} = 15.63$, $p<0.05$) and place of residence ($\chi^2_{(2)} = 9.53$, $p<0.05$) has significant association with the satisfaction level of parents. Whereas age of the child ($\chi^2_{(6)} = 8.20$, $p>0.05$), age and educational status of parents ($\chi^2_{(6)} = 4.91$, $p>0.05$), $\chi^2_{(16)} = 15.11$, $p>0.05$) and occupation of parents ($\chi^2_{(10)} = 12.55$, $p>0.05$) were not significantly associated.

DISCUSSION

The current study revealed that majority of the parents (55.6%) were moderately satisfied, (26.3%) highly satisfied and only (18.1%) were not satisfied at all. Similar findings were observed by Momani MM⁸ Yasodha P⁹ and Das P, et al¹⁰ Whereas Devasia¹¹, Ammentorp J¹² and Marino B L S¹³ observed very few parents were moderately satisfied which is in contrast with the present study.

In the present study it was found that there is no significant difference in the level of satisfaction between mother and father of the hospitalized child ($t=0.407$ for $df = 158$, as p value= 0.684 which is >0.05). This finding is consistent with the study findings done by Kandari et al¹⁴, Halfon N et al¹⁵ which revealed that there is no significant difference in the parents' perception of quality nursing care to their hospitalized children regardless of the sex of the parents.

In the present study, significant association was found between level of parents' satisfaction with sex of the

child, total family income, dependency of the child, duration of hospital stay, and place of residence. The finding is consistent with the study findings done by Joshi P¹⁶ and Puotiniemi et al¹⁷, in their study revealed that there is a significant relationship between the parents' satisfaction and the duration of hospital stay of the parents with their child. No significant relationship could be established between the parents' satisfaction level with the age of the child, parents' age, educational status and occupation. This finding is contrast with the study findings done by Virginia E¹⁸ which reveals that higher satisfaction scores to the nursing care to their hospitalized children is associated with levels of educational status of the parents.

CONCLUSION

This study clearly demonstrates that majority of the parents have moderate levels of satisfaction with the nursing care provided to their child during hospitalisation. Still very few parents were fully satisfied which needs to be addressed. Low level of satisfaction of parents indicates inadequate knowledge of the nurses in providing care to the children. The findings could be utilized as a basis for conducting in-service education programme for the nurses, so that they develop a constant awareness and a clear understanding of the care of children. This in turn will assist in increasing the level of satisfaction of parents and planning for adequate staffing as well as nursing care activities.

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ORIGINAL PAPER

Histo-morphological Changes in Lungs with Asphyxial Death Cases

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ABSTRACT

Asphyxial death is a common incident in forensic practices, and determination of the manner of death *that may be accidental, suicidal, homicidal, or natural is of utmost significance. In such deaths, a detailed and meticulous autopsy plays a major role to solve the case while the scene investigation and collection of samples have their own significance. This study has been undertaken on 11.54% medico-legal cases of asphyxia to find out some conclusive differentiating histo-morphological findings among the various types of asphyxial deaths from findings of autopsy.*

Key Words: Asphyxia, Intra-alveolar Hemorrhage

INTRODUCTION

Literally, the term **asphyxia** means absence of pulsation (pulselessness), though its usage in Forensic Medicine has generally come to mean a lack of oxygen. Actually Asphyxia is best described as an interference with respiration due to any cause, Mechanical, Environmental, or Toxic¹.

Because of the increasing **scrutiny of media and lawyers in forensic issues**, forensic histo-pathology becomes an essential link in the chain of a suspicious death investigation. During the year 2011 and 2012, asphyxial deaths cases were 15.8% and 19% respectively. So there is enough scope of doing such study, as the number of such cases is high.

MATERIALS AND METHODS

This study is an **autopsy based descriptive cross-sectional study** undertaken on asphyxial death cases brought for autopsy at Gauhati Medical College from 1st July 2012 to 30th June 2013. Relevant information was obtained from police, relative of the deceased, person accompanying the corpse and hospital records, if hospitalized prior to death. Detailed autopsy was performed in all the cases and findings were recorded in a suitable proforma especially made for this study. Ten healthy cases were included as a control sample.

OBSERVATIONS AND RESULTS

Incidence of Asphyxial Death Cases

Out of the 2772 cases being autopsied in mortuary, 11.54% cases were of deaths due to asphyxia.

Types of Asphyxial Deaths

The incidence of various asphyxial deaths (**Table 1**) was recorded and, out of 320 asphyxial death cases, hanging was most common (78.12%) of which 54.06% were male,(20%) cases were due to drowning, of which 16.25% cases were male. Three cases were due to strangulation with female preponderance. All the three cases of choking were males.

Table 1 Various Methods of Asphyxial Deaths

| Methods of Asphyxia | Male | | Female | | Total | |
|---------------------|------------|---------------|-----------|---------------|------------|-------------|
| | No. | % | No. | % | No. | % |
| Hanging | 173 | 54.06% | 77 | 24.06% | 250 | |
| 78.12% | | | | | | |
| Drowning | 52 | 16.25% | 12 | 3.75% | 64 | 20% |
| Strangulation | 1 | 0.31% | 2 | 0.62% | 3 | 0.94% |
| Choking | 3 | 0.94% | 0 | 0% | 3 | 0.94% |
| Total | 229 | 71.56% | 91 | 28.44% | 320 | 100% |

Weight of Lung in Asphyxial Death Cases

The weight of the lungs in hanging cases was found to be in the range of 401-500 grams in maximum number of cases. The weight of the lungs in different types of asphyxial death are shown in **Table 2**.

Table 2 Weight of both the lungs in grams

| Weight of both lungs in grams | Hanging (250) | | Drowning (64) | | Strangulation (3) | | Choking(3) | | Total(320) | |
|-------------------------------|---------------|-------------|---------------|-------------|-------------------|-------------|------------|-------------|------------|-------------|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| 101-200 | 0 | 0% | 2 | 3.12% | 0 | 0% | 0 | 0% | 2 | 0.63% |
| 201-300 | 1 | 0.4% | 1 | 1.56% | 0 | 0% | 0 | 0% | 2 | 0.63% |
| 301-400 | 1 | 0.4% | 2 | 3.12% | 1 | 33.33% | 0 | 0% | 4 | 1.25% |
| 401-500 | 165 | 66% | 5 | 7.82% | 0 | 0% | 2 | 66.67% | 172 | |
| 53.75% | | | | | | | | | | |
| 501-600 | 80 | 32% | 3 | 4.69% | 2 | 66.67% | 1 | 33.33% | 86 | |
| 26.88% | | | | | | | | | | |
| 601-700 | 3 | 1.2% | 2 | 3.12% | 0 | 0% | 0 | 0% | 5 | 1.56% |
| 701-800 | 0 | 0% | 14 | 21.88% | 0 | 0% | 0 | 0% | 14 | 4.37% |
| 801-900 | 0 | 0% | 29 | 45.31% | 0 | 0% | 0 | 0% | 29 | 9.06% |
| 901-1000 | 0 | 0% | 6 | 9.38% | 0 | 0% | 0 | 0% | 6 | 1.87% |
| Total | 250 | 100% | 64 | 100% | 3 | 100% | 3 | 100% | 320 | 100% |

MORPHOLOGY (EXTERNAL) OF THE LUNG

In Hanging Cases

The margins of the lungs were sharp in 85.2% cases and round in 14.8% cases. Lungs were spongy in 97.6% cases and doughy in 2.4% cases. Regarding the colour, in 82% of the cases, the lungs were pink, congested in all the cases of hanging. Petechial haemorrhages were present in 24.4% cases.

In Drowning Cases

The margins of the lungs were round in 87.5% and sharp in 12.5%cases. Lungs were doughy in 81.25% and spongy in 18.75% cases. In 78.12% of the cases the colour is pink followed by purple,17.18% cases. The lungs were congested and voluminous. Paltauf's haemorrhage was present in 21.87% cases.

In Strangulation Cases

The margins of the lungs were sharp in 66.67% and round in 33.33% case. Lungs were pinky, spongy and congested in all the cases.

In Choking Cases

The margins of the lungs were sharp in 66.67% and round in 33.33% case. Lungs were spongy and congested and pink in all cases.

HISTOLOGICAL FINDINGS OF LUNG

In Hanging Cases

Table 3, shows that, amongst the hanging cases, congestion was found in 81.2% cases; interstitial oedema was found in 9.2% cases; alveolar haemorrhage was detected in 26.4% cases; intra-alveolar oedema was found in 9.6% cases; bronchiolar constriction was present in 1.6% cases; alveolar dilatation was detected in 1.6% cases and interstitial haemorrhage was found in 1.2% cases.

Table 3 Histological findings of lung in hanging

| Findings | Hanging (Total no. of cases = 250) | |
|--------------------------|------------------------------------|--------|
| | Number | % |
| Congestion | 203 | 81.20% |
| Interstitial oedema | 23 | 9.2% |
| Interstitial haemorrhage | 3 | 1.2% |
| Alveolar haemorrhage | 66 | 26.4% |
| Intra-alveolar oedema | 24 | 9.6% |
| Bronchiolar constriction | 4 | 1.6% |
| Alveolar dilatation | 4 | 1.6% |

In Drowning Cases

Within the drowning cases, alveolar dilatation was detected in 76.56% cases, intra-alveolar oedema was detected in 65.62% cases; interstitial oedema was present in 54.68% cases; congestion in 17.18% cases, bronchiolar constriction in 31.25% cases, interstitial haemorrhage in 3.12% cases, and alveolar haemorrhage in 10.93% cases (**Table 4**).

Table 4 Histological findings of lungs in drowning cases

| Findings | Drowning (Total no. of cases = 64) | |
|--------------------------|------------------------------------|--------|
| | No. | % |
| Congestion | 11 | 17.18% |
| Interstitial oedema | 35 | 54.68% |
| Interstitial haemorrhage | 2 | 3.12% |
| Alveolar haemorrhage | 7 | 10.93% |
| Intra-alveolar oedema | 42 | 65.62% |
| Bronchiolar constriction | 20 | 31.25% |
| Alveolar dilatation | 49 | 76.56% |

In Strangulation

In all (100%) cases of strangulation, alveolar haemorrhage was detected. Congestion was found in 33.33% case and bronchiolar constriction was found in 66.67% cases. Other features like interstitial oedema, intra-alveolar oedema, interstitial hemorrhage, etc., were not detected in the strangulation cases (**Table 5**).

Table 5 Histological findings of lung in strangulation cases

| Findings | Strangulation (Total no. of cases = 3) | |
|--------------------------|--|--------|
| | No. | % |
| Congestion | 1 | 33.33% |
| Interstitial oedema | 0 | 0% |
| Interstitial haemorrhage | 0 | 0% |
| Alveolar haemorrhage | 3 | 100% |
| Intra-alveolar oedema | 0 | 0% |
| Bronchiolar constriction | 2 | 66.67% |
| Alveolar dilatation | 0 | 0% |

In Choking

In choking, all the cases, had congestion, and interstitial oedema. Bronchiolar constriction was found in 66.67% cases. Interstitial haemorrhage, alveolar haemorrhage, alveolar dilatation, etc., were not found in the choking cases studied. The control case has no significant findings except congestion of the lungs.

DISCUSSION

Incidence of Asphyxial Death Cases

The incidence rate of asphyxial death in the present study is found to be **11.54%**. The findings of present study are different from the study of *Singh A et al²*, *Palimer Vikram et al³*, *Chaurasia N, Pandey SKet al⁴*, and *Dhillon Sangeet et al⁵* who observed slightly lower incidence of violent asphyxial deaths in their study. However, *Choudhury BL⁶*, *Patel-A⁷* and *Azman D⁸* observed slightly higher incidence.

The findings of present study are similar with the study done by *Lalwani Set al⁹* in which the incidence of violent asphyxial deaths comprised approximately 11.21% of all forensic autopsies. The reason for variation in the incidence of asphyxial death in the different parts of world may be due to cultural, ethnic, geo-graphical and genetic difference.

Types of Asphyxial Deaths

In the present study, it was observed that hanging was the commonest form (78.12%) of asphyxial death followed by drowning (20%), choking (0.94%) and strangulation (0.94%). The findings of the present study is similar with the several workers like Singh B et al¹⁰, Momochand A et al¹¹, Azmak D⁸, Palmer Vikram³, Chaurasia N, Pandey SK et al⁴, Choudhury BL⁶ and Patel Ankur et al⁷ in which hanging constitutes the majority of cases. This study however differs from the study of Singh A et al², where drowning is the leading cause.

Weight of Lung in Asphyxial Death Cases

The weight of both the lungs in hanging cases was found to be in the range of 401-500 grams in maximum number of cases, i.e. 66%. In cases of drowning 45.31% cases had maximum weight of lungs which were found in the range of 801-900 grams followed by 21.88% cases in the range of 701-800 grams. In 66.67% cases of strangulation, the weight of lungs were detected in the range of 501-600 grams and 33.33% case had weight in the range of 301-400 grams. In cases of choking, 67.67% cases had weight in the range of 401-500 grams and 33.33% case in the range of 501-600 grams.

Copeland¹² found the weights of lung in drowning were around 600-700g, whilst the non-drowned were in the 370-540g ranges.

Pathak NM¹³ recorded the average weights of lungs in cases of hanging and found maximally in the range of 301-400 grams (64.7 %). In cases of drowning 63.63% cases had maximum weights of the lungs in the range of 701-800 grams. According to Polson CJ¹⁴, in drowning cases, the weight of lung is increased to about twice the normal weight, i.e., 700-800 g.

The findings of the above studies are almost similar with the findings of the present study. However, the findings of Kringsholm et al that 7 per cent of cases of dry-lung drowning with a combined lung weight of less than a kilogram and in the remainder, the average weight of both lungs, 1411 g, compared to 994 g in controls, contradicts the present study.

External Morphology of Lung in Hanging Cases

The lungs were found congested with sharp margin, spongy and pink in colour in maximum number of hanging cases. However, Petechial haemorrhages (Tardieu's spots) were present in 24.4% cases only which is marginally different from the findings of Luke JL et al¹⁵ who found petechiae in 21% cases. **The formation of petechiae in hanging cases may be caused by an acute rise in venous pressure that in turn causes over-distension and rupture of thin-walled peripheral venules, especially in lax tissues, such as the eyelid, and in unsupported serous membranes, such as the pleura and epicardium.**

External Features of Lung in Drowning Cases

In maximum number of cases of drowning the margins of lungs were round 87.5% and consistency was doughy 81.25%. Majority, i.e. 78.12% cases had pink colour followed by purple in 17.18% cases. Paltauf's haemorrhage was present in 21.87% cases of drowning. The above findings are consistent with Shkrum M J, Ross CF¹⁶, Taylor AS¹⁷, Reddy KSN¹, Mukherjee JB¹⁸, viz. K and Polson CJ¹⁴.

Presence of large sub-pleural haemorrhages (Paltauf's haemorrhage) may be due to rupture of inter-alveolar partitions beneath the pleura. They are more prominent over the lower lobes, and the inter-lobar surfaces.

Histological Findings of Lungs in Hanging Cases

It was observed from the present study that congestion, 81.2% and interstitial oedema 9.2% were more frequent in hanging cases than strangulation where as alveolar haemorrhage was more common in strangulation than hanging (26.40%).

The findings of the present study are similar to some extent with the findings of the study conducted by Carlos Delmonte, Vera Luiza Capelozzi¹⁹, Shkrum MJ in which the lung parenchyma in suicidal hanging is predominated with intra-alveolar haemorrhage, alternating areas of alveolar collapse and over-insufflations with zones of bronchiolar constriction and dilatation and Pathak NM¹³, in which, 29.41% cases of hanging had bronchiolar constriction followed by intra-alveolar haemorrhage, 23.53% cases.

The presence of oedema in hanging cases may be due to exaggerated negative intra-pleural pressure which results in increased venous return to the right ventricle and increased pulmonary blood flow and elevated capillary hydrostatic pressure. These changes favor the transudation of fluid from the pulmonary capillary into the interstitial and alveolar spaces. Also, hypoxia may be partly responsible for development of pulmonary oedema. Congestion of the lung may be due to the obstructed venous return (venous stasis) and hypoxia of the vascular endothelium.

Histological Findings of Lungs in Drowning Cases

Within the drowning cases, alveolar dilatation 76.56%, interstitial oedema 54.68% and intra-alveolar oedema 65.62% were statistically more frequent. The other parameters, although still present, were not as statistically significant in drowning as the oedema was.

The findings of the present study are similar to the findings of *Carlos Delmonte et al¹⁹*, *Perez-Carceles, et al²⁰*, *Pathak NM¹³*, *Taylor AS¹²* and *Ross CF⁶*.

The presence of intra-alveolar and interstitial oedema in drowning cases may be due to deposition of proteic and amorphous material. Freshwater is hypotonic relative to plasma and causes disruption of alveolar surfactant. This results in alveolar instability and atelectasis. Seawater, which is hyperosmolar relative to blood, increases the osmotic gradient and, therefore, draws fluid into the alveoli. This dilutes the surfactant. Both mechanisms injure the alveolar/ capillary unit, resulting in a lower functional residual capacity and pulmonary oedema.

Histological Findings of Lungs in Strangulation

The alveolar haemorrhage (100%) was significantly higher in lungs associated with strangulation. Equally significant was the association of bronchiolar constriction (66.67%) and congestion (33.33%). This particular morphologic picture thus characterized the lung involvement in asphyxial deaths due to strangulation. The findings of the present study is similar with the study conducted by *Carlos Delmonte et al¹⁹*, *Pathak NM¹³* and *Michael JS, Grellner W et al²¹*, *Mukherjee JB¹⁸*, *Modi JP²²* and *KSN Reddy¹*.

The predominance of alveolar haemorrhage in strangulation cases may due to morphologic

disarrangement of the bronchiolar and alveolar architecture which changes the ventilation/perfusion relationship leading to acute vascular congestion and engorgement of capillaries protruding into the alveolar space causing rupture and haemorrhage.

Histological Findings of Lung in Choking

Interstitial oedema 100% and congestion 100% were statistically more frequent in choking than in hanging or strangulation. Congestion is present in all the forms of asphyxial deaths whereas interstitial oedema was a common parameter between choking and drowning cases. Bronchiolar constriction 66.67% also characterized choking.

Findings of the present study are in accordance with the findings of the study conducted by *Carlos Delmonte et al¹⁹*, *Pathak NM¹³*, *Michael JS and Taylor AS¹²*. The control cases has no significant findings except congestion of the lungs.

CONCLUSION

The present study revealed some common morphologic parameters for the different groups of asphyxia, but in cases histologically analyzed, the pulmonary architecture showed variables mainly in the degree of interstitial oedema, intra-alveolar oedema, alveolar haemorrhage, bronchiolar constriction, and alveolar dilatation. We have also seen that by means of a simple and quick histopathology method, with negligible additional cost to the Forensic Institute, it is possible to further characterize four specific groups of asphyxia and to suggest a specific diagnosis with reasonable accuracy. The method also allowed obtaining complementary parameters to refuse natural causes of death.

Ethical clearance: Taken

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Conflict of Interest: Nil

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ORIGINAL PAPER

A Study of Hyoid Bone Fracture in Cases of Ante mortem Hanging

Baishya Manoj Kumar

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ABSTRACT

Hyoid bone fractures are rare injuries that can be difficult to diagnose. Typically resulting from a direct compression to the anterior neck, hyoid fractures can lead to subcutaneous edema and subsequent airway compromise and death. Typically, these fractures have tremendous medico legal importance in forensic investigation. To raise awareness of this potentially dangerous fracture, the authors studied 316 cases of hanging cases to find out hyoid bone fractures in medico legal autopsy at Gauhati Medical College, Assam. This study has tried to evaluate the different aspect of three-isolated hyoid bone fracture amongst those cases of hanging.

Key Words: Hyoid Bone, Fracture, Suicide

INTRODUCTION

The hyoid bone, which is also known as lingual bone, is situated in the anterior midline of the neck between the chin and the thyroid cartilage. The bone consists of a central part called the body and two pairs of cornua, two greater cornua and two lesser cornua.

The primary role of the hyoid bone is to support the weight of the tongue, allowing people to articulate words while speaking, and enabling the production of a wide range of vocalizations. In addition to being of interest to living humans, the hyoid also bears important in forensic analysis. When the hyoid bone is broken, it is a strong indicator that someone was strangled, as the bone is otherwise extremely difficult to break. So when any case of hanging, strangulation or throttling comes for postmortem examination, the hyoid becomes the most integral part of internal examination at the autopsy table. Victims of compression of neck will more likely have fracture of hyoid bone if his hyoid bone is fused.¹ Fracture of the hyoid bone is rare, accounting for only 0.002% to 1% of all fractures.^{2,3}

Many authors and workers in this field have seriously highlighted fracture of hyoid bone. Though percentage of hyoid bone fracture in cases of hanging vary according to different research study by different author, but almost all study groups agreed that hyoid bone fracture increases with age above 40 years due to calcification, loss of elasticity and immobilization.

This article has aimed to evaluate the importance of age as contributing variable of hyoid bone fracture in cases of ante mortem hanging.

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OBJECTIVE

To analyze the frequency of hyoid bone fractures caused by suicidal hanging and compare the different methods of visualizing the those fractures. Results could be used for forensic purposes.

MATERIAL AND METHODS

1. The present study was of 1 (one) year duration from 1st July, 2012 to 30th June, 2013, conducted upon all cases of death due to hanging which were autopsied in the mortuary of the Department of Forensic Medicine, Gauhati Medical College and Hospital, Guwahati, Assam.
2. The material for this study included all types of death due to hanging brought by police personal of different police station/outpost to our department for medico legal autopsy.
3. A Standard autopsy protocol was adopted with proper external examination and followed by internal examination. After palpation, the hyoid was very carefully removed from underlying structure to examine it thoroughly regarding the fracture number, site, type, etc.
4. Diagnosis of fracture of hyoid bone was solely made by placatory method and gross examination with

naked eye. No pre autopsy X-ray of hyoid bone or help of microscopy was taken to diagnose fracture.

OBSERVATION AND RESULTS

In this present study, it was observed that out of total 2772 cases, death due to hanging accounted only in 316(11.40%) and all were suicidal in nature.

Out of 316 hanging cases, only three (0.94%) cases showed evidence of neck structure of hyoid bone fracture. Hyoid bone fracture was found in all these three cases (0.94%). Only in two cases (0.63%) of this study fracture of the thyroid cartilage was found. Out of these three cases, two had combined fracture of hyoid bone and thyroid cartilage. One case of isolated hyoid bone fracture was observed in this study. In two cases, right greater horn was involved and in one case left greater horn. Abduction type of fracture was seen in all these three fracture cases of hyoid bone.

In the present study, it has been observed that incidence of hyoid bone fracture increases with age as shown in **Table 1**. Out of these three cases of hyoid bone fracture two cases were in the age group of 41-50 years and one case was in the age group of 71-80 years. Thus incidence of hyoid fracture was 12.5% for 71-80 years age group followed by 4.34% for the age group 41-50 years. The age wise distribution of hyoid bone fracture is also shown in **Figure 1**.

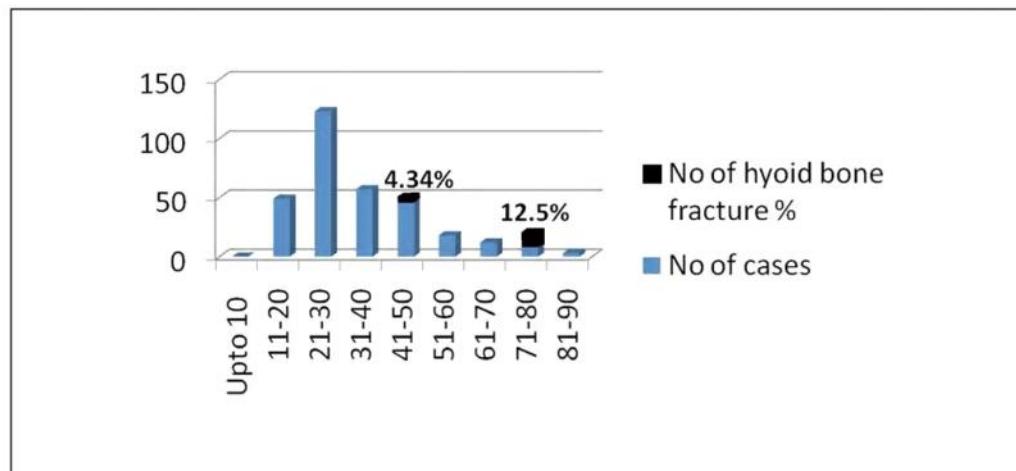
Table 1 Age Wise Distribution of Hyoid Bone Fracture

| Age in Years | No Of Cases (Total=316) | With Fracture | | Without Fracture | |
|--------------|-------------------------|---------------|------------|------------------|------------|
| | | Frequency | Percentage | Frequency | Percentage |
| 00-10 | 0 | 00 | 00 | 0 | 100 |
| 11- 20 | 49 | 00 | 00 | 49 | 100 |
| 21-30 | 123 | 00 | 00 | 123 | 100 |
| 31-40 | 57 | 00 | 00 | 57 | 100 |
| 41-50 | 46 | 02 | 4.34 | 44 | 95.65 |
| 51-60 | 18 | 00 | 00 | 018 | 100 |
| 61-70 | 12 | 00 | 00 | 12 | 100 |
| 71-80 | 8 | 01 | 12.5 | 7 | 87.5 |
| 81-90 | 3 | 00 | 00 | 3 | 100 |

Considering the age demarcation of 40 years, it was found that fracture incidence increases above the age of 40 years as shown in **Table 2**. No case with hyoid fracture was seen below the age of 40 years.

Table 2 Hyoid Bone Fracture in Relation to 40 Years Age Margin

| Age | Total Case (316) | Absence of Fracture | | Presence of Fracture | |
|------------------|------------------|---------------------|----------------|----------------------|----------------|
| | | Frequency | Percentage (%) | Frequency | Percentage (%) |
| Upto 40 yrs | 229 | 229 | 100 | 0 | 0 |
| More than 40 yrs | 87 | 84 | 96.55 | 03 | 3.44 |

**Figure 1** Bar Graph Showing Age Wise Distribution of Hyoid Bone Fracture

DISCUSSION

Hyoid bone consists of the body and the greater and lesser horns. The fibrous connection between the greater horns and the body undergoes full osseous fusion in midadulthood. Multiple anterior neck muscles insert on its superior and inferior surface.

Incidence of fractures increases with age because neck structures become calcified and more brittle in middle and later life.

The present finding is also supported by previous studies conducted by Polson CJ et al⁴, Sharma BR et al⁵, Cle'ment Renaud et al⁶, Charoennate Nantana et al⁷, etc. Elfawal MA and Awad OA⁸ stated that Individuals under 40 are generally regarded as less likely to sustain fractures because of the elasticity of the cartilage and mobility of the joints of the hyoid bones and the fact that young hyoid bone tends to be supple and bends rather snaps under pressure.

According to Wyatt JP et al⁹, Drake RL, Vogl AW, Mitchell AWM¹⁰ bony fusion of the greater horn and body of the hyoid bone is rare in an individual under 20 years old and increases with advancing age and hence incidence of fracture increases.

CONCLUSION

Fractures of the hyoid bone in 0.94% who died of suicidal hanging were related with older ages and incomplete hanging but not related with location of the knot. Hyoid bone is one of the most integral parts of internal examination during autopsy of hanging, ligature strangulation or throttling case. The incidence of hyoid fracture in hanging varies from one study to the next, from 0 to 60%.

Factors like age, sex, weight of the victim, type of suspension, position of ligature around the neck, ligature material etc may influence causation of fracture. However the most important one is the age of the victim.

To establish the fact with confirmation that age is the most strong and important contributing variable for hyoid fracture in hanging cases, one need further continuous study in this regard taking large sample.

Ethical clearance: Taken

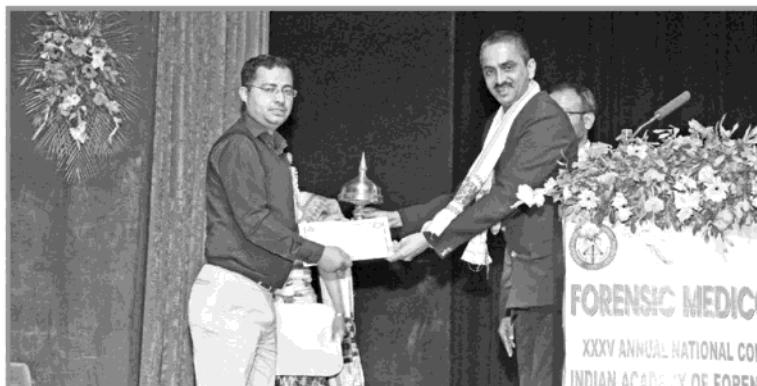
Source of funding: Nil

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Dr. Raktim Pratim Tamuli, Demonstrator of Tezpur Medical College, Tezpur, Assam, India was awarded the best Poster at IAFM conference "Forensic Medicon 2014" held at Guwahati Medical College, Guwahati, Assam in 2014

CASE REPORT

Fatal Air Embolism Following Dilatation and Curettage and Attempted Tubal Ligation

Debbarma Juthika¹, Debbarma Antara²

Accepted (Revised): December 16, 2014

ABSTRACT

Fatal air embolism especially venous air embolism is probably one of the most common embolic events to occur with the increased use of invasive techniques in medicine. The overall incidence of air embolism in any laparoscopic surgical procedures can be upto 69% of the patients. Death from air embolism commonly occurs within few minutes and usually is not delayed beyond 45 minutes. A 31 years old lady with one and half month's amenorrhea came to hospital for medical termination of pregnancy and tubal ligation. Accordingly dilatation and curettage was successfully done and when pneumoperitoneum was created for laparoscopic tubal ligation she collapsed on the operating table and immediately ligation procedure was aborted. She died within one hour of the procedure. On postmortem examination crepitus was felt on palpation of uterus and air columns were present in the pulmonary and cardiac vessels.

Key Words: Air embolism, MTP, pneumoperitoneum

INTRODUCTION

Fatal air embolism especially venous air embolism is probably one of the most common embolic events to occur with the increased use of invasive techniques in medicine. Laparoscopic obstetrics and gynecological procedures accounts for 11-97% of incidence of fatal air embolism.¹

The overall incidence of air embolism in any laparoscopic surgical procedures can be upto 0.0014% to 0.6% of the patients.² Death from air embolism commonly occurs within few minutes and usually is not delayed beyond 45 minutes.³

CASE REPORT

A 31 years old lady, G3P2 came to the OPD of Obstetrics and Gynecology in a hospital at Agartala with history of one and half months amenorrhea for medical termination of pregnancy and tubal ligation. She was taken to OT and at first dilatation and curettage was done successfully. Then for laparoscopic tubal ligation spinal anesthesia was given and pneumoperitoneum was gradually created. During the air insufflations procedure suddenly the patient collapsed. Immediately the procedure was aborted and resuscitation was done. However the patient died within one hour of commencement of whole procedure. There was no history of hypertension and heart disease. The history and the circumstances led to the suspicion of embolism.

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AUTOPSY FINDINGS

She was of obese built. On autopsy, laparotomy wound was seen, i/v needle prick marks were seen on the dorsum of left hand and spotting of blood was seen from the vagina. On dissection, the skin was reflected and checked for the presence of pneumothorax. The sterno-clavicular joint was spared as pulling back the sternum may cause the air to be sucked into the veins. The lower part of sternum was cut and at the manubrium the ascending aorta and venecava were clamped. Incision was given over the pericardium and the pericardial cavity filled with water. The heart was punctured at the right ventricle with a scalpel and multiple air bubbles were seen coming out. On examination, the epicardial veins of the heart showed beaded appearance with numerous air columns along the whole length especially at the great cardiac veins. (Figure 1).



Figure 1 Epicardial veins showing multiple air columns along the whole length

The right side of the heart, venecava, pulmonary artery and pulmonary veins showed presence of bright red colour frothy fluid. All the other organs were congested. The uterus weighed 200Gms with dimensions of 13cmX10cmX3cm. On palpation of the uterus; crepitus was felt due to the entrapment of air within the muscle layers. The uterine cavity was empty. One uterine tumour (4cmX3cm) was present over the fundus of the uterus. There were multiple dilated open sinuses near uterine tumour and also in other parts of the myometrium (Figure 2).

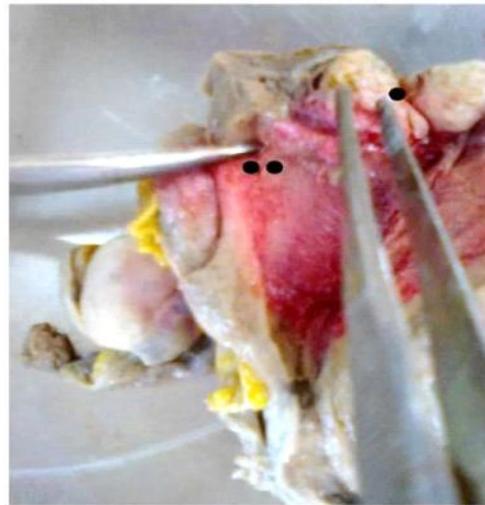


Figure 2 Leiomyoma (one bullet) and multiple dilated uterine sinuses (two bullet)

The cervix was contused with superficial laceration. The ovaries were congested and on cut section corpus luteum was present in the left ovary (Figure 3).



Figure 3 Corpus luteum in ovary

Multiple air bubbles were also present within the layers of the mesentery, intestinal walls and over the capsules of both the kidneys (Figure 4). Multiple petechiae were present in the white matter of the brain (Figure 5).



Figure 4 Presence of air bubbles at multiple places



Figure 5 Petechial hemorrhages in white matter of brain

The whole uterus along with appendages was sent for histopathological examination. The histopathological examination revealed the uterine growth as leiomyoma and the presence of dilated sinuses in the uterus. The toxicological analysis report of the viscera was negative for the presence of benzodiazepines and ethyl alcohol. The cause of death was given as shock as a result of air embolism consequent upon dilatation and curettage and attempted pneumoperitoneum.

DISCUSSION

Air embolism is entrainment of air or gas from operative field or other communications into the venous or arterial vasculature.¹⁻⁴ Orebough suggested that entry of 300-500 ml of air at a rate of 100 ml/sec can produce fatal air embolism.⁴ Durant⁵ in the year 1947 studied air embolism in dogs and suggested that the amount of air entering the blood stream, the speed of entry and the position of the

body were the factors which determined mortality in cases of air embolism. Cormack⁶ in 1850 reported the first case of venous air embolism in obstetric population. When a large bolus of air enters the venous system, air being compressible mixes with blood and forms froth thereby creating "air lock" in the right atrium and ventricle. This air lock causes obstruction in the right ventricular outflow, pulmonary hypertension, right ventricular strain and eventually cardiac failure^{2,7}. Geissler et al⁸ gave another proposed mechanism for cardiac failure. They proposed that increased right ventricular after load and arterial hypotension, possibly with subsequent right ventricular ischemia is the primary mechanism for cardiac dysfunction in venous embolism. Venous air embolism is a potential complication of laparoscopic, neurosurgical, pelvic, and orthopedic procedures. Although a venous gas embolism is a rare complication of laparoscopic surgeries, seen in 0.0014% to 0.6% of laparoscopic cases, it is associated with a 28% mortality rate.² During pregnancy, injection of air or fluid mixed with air or soap water into the pregnant uterus for procuring abortion⁴ or blowing of air into the vagina during orogenital sex⁷,⁸ can be the causes of fatal air embolism as the enlarged uterine sinuses provides more exposure to entry of air. Other causes includes trauma to the chest and neck, intravenous injections, artificial pneumothorax and barotraumas in scuba divers.¹⁻¹⁰

In this case, dilatation and curettage conducted for medical termination of pregnancy, the dilated uterine sinuses and insufflations of air for laparoscopic tubal ligation were the causes for air embolism.

Air embolism is a life-threatening complication of obstetric or gynecologic procedures.¹¹ Usually gas embolism can occur in laparoscopic procedures from puncture of veins by the trocar or veress needle. But sometimes it may occur from laceration of the vessels due to separation of the tissues by the increasing volumes of the gases injected.¹² Air embolism is known since the early nineteenth century but its incidence has significantly increased in the last three decades due to the fact that the numbers of laparoscopic surgery have increased considerably. Proper monitoring of the vitals and position of the patient in the left lateral decubitus position with the head tilted downwards will place the right ventricular outflow tract below the right ventricular cavity which will allow the air to migrate up and escape out of the ventricular tract, thereby preventing the complications of air embolism.^{4,13}

CONCLUSION

Air embolism is a recognized risk in laparoscopic procedures especially in obstetrics and gynecology and is associated with high morbidity and mortality. It is therefore very essential for the operating surgeons and anesthesiologist to recognize and treat venous air embolism to avoid such mishaps on the operating table.

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Dr. Shoumik Chowdhury won the Scottish Travel Price at Forensic Medicon 2015



Dr. Yogender Malik Receiving Best Paper Certificate at Forensic Medicon 2014

CASE REPORT

Death as a Result of Body Packer's Syndrome

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Accepted (Revised): December 24, 2014

ABSTRACT

A 42-year-old male was under the custody of narcotics department and he was produced before the court for taking permission of medical check-up. According to the police report the deceased had tried to escape from custody while traveling to court and suddenly collapsed. When he was brought to J. J. Hospital, declared dead before the admission. Autopsy was performed twelve hours after the incident. Total one hundred twenty (120) identical oval shaped "Capsule" packages were found in the stomach, small intestine, large bowel, rectum, anal canal and one of them was ruptured. This case is the first accidental death of a body packer in Mumbai in which such large quantity of drugs capsules has been recovered and demonstrates that body packing is an existing problem today.

Keywords: Body Packing, Capsules, Narcotics, Death.

INTRODUCTION

Concealment and transit of narcotic materials (e.g., opium and heroin) is one of the major businesses with high benefit in all over the world.¹⁻² Body packing is the term used for the intracorporeal concealment of illicit drugs mainly opium, heroin, cocaine, amphetamines, 3,4-methylenedioxymethamphetamine (ecstasy), and marijuana or hashish. Body packers may also be called "swallowers," "internal carriers," "couriers," or "mules." Body packers usually carry about one kg (2.2 lb) of drug, divided into 50 – 100 packets of 8 – 10 g each, although persons carrying more than 200 packets have been reported.³ Each packet of opium, heroin, cocaine, or amphetamine contains a life-threatening dose of the drug.^{3,5} These drugs are wrapped in the forms of capsules, condoms, balloons, plastic bags, or finger of latex gloves and located in various anatomic cavities or body orifices.^{3,6} Identification of suspected persons is difficult for the customs officers at the national borders or airports.⁶⁻⁸ The body packers are especially prone to rupture of the packets and consequent toxicity. In addition, gastrointestinal (GI) obstruction may occur and also there are some reports about upper GI hemorrhage caused by prolonged pressure of the packets on the gastric mucosa.⁹ The first reported body packer that swallowed a condom filled with hashish was in Toronto in 1973.¹⁰ Since then the smuggling of illicit drugs is becoming increasingly common.¹¹⁻¹⁴ Although body packers are young men, the use of children and pregnant women has been reported.¹⁵

CASE REPORT

Case History: Custom duty officers on airport arrested a 42-year-old male and he was under the custody of narcotic department. When he was produced before the court for taking permission of medical check up, he has tried to escape, but during running he suddenly collapsed and became unconscious. When he was brought to J.J. Hospital, he was declared dead before the admission.

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AUTOPSY FINDINGS

(Figure 2,3,4,5,6,7,8)

On X-ray examination multiple capsules were seen in abdomen and in pelvis (Figure 1)



Figure 1 X-Ray Showing Capsules

On external examination it was found that rigor mortis was passed away. Yellow coloured dried powdery particles present at angle of mouth on both sides. Oozing of blood-tinged fluid from nose, purging was present, cyanosis of nails and lips present. Abrasions present over extensor aspect of right and left forearm and dorsal side of right hand.

On internal examination of head under scalp petechial hemorrhages seen. Stomach contains brownish colored semisolid fluid with 25 identical oval shaped capsules, which were wrapped in thin elastic white colored material in multiple layers.



Figure 2 Stomach with capsules



Figure 3 Capsules inside the stomach
In small and large intestine 95 capsules were present.



Figure 4 Large Intestines with Capsules



Figure 5 Small Intestines with Capsules



Figure 8 Ruptured Capsule



Figure 6 Capsules Within Intestine

Ileocaecal junction was hemorrhagic. All the organs were congested with cerebropulmonaryedema. Total 120 capsules were retrieved from gastrointestinal tract of which one found ruptured (Figure 8).



Figure 7 Capsules Recovered From Body

Samples preserved are viscera, skin swab of dried vomitus around mouth and leaked capsule for chemical analysis. Tissue is for histopathology. Cause of death was given as " Evidence of ruptured of capsule in large intestine with intestinal hemorrhage however final opinion reserved pending for accessory examination reports".

TOXICOLOGICAL FINDINGS

The fine powders of the ruptured pack and of one sample of the intact packs were positive for Cocain after chemical analysis. The toxicological analysis of the post-mortem blood revealed Cocain concentration of 1.15 mg/100ml. No heroin, 6-monoacetylmorphine, other drugs and alcohol were detected in blood.

DISCUSSION

Body packing is a method for smuggling of illicit drugs and has become a common problem at borders and airports of several countries. Smuggling of cocaine by means of body packing is a common problem at the Indian, U.S. and African airports and heroin body packing seems to be more frequent in Asia and Europe¹⁵. There are not statistic data for drug smugglers worldwide because few of them are arrested. The number of undetected cases is undoubtedly high. A sudden death can be observed in "body-packing syndrome" due to fatal acute intoxication, intestinal obstruction and delirium¹³. The use of body packing as a way of smuggling illicit drugs can be extremely hazardous, because of the risk of leakage or bursting of the container¹⁰. Due to this high risk acute lethal intoxication is the most common cause of death among body packers.

Poor or inadequate packaging may result in rupture and leaking of the drug packet with subsequent bowel absorption. Damage of the pack can be caused instomach by mechanical movements or chemical digestion of the binding by which the pack is tied. Cocaine, heroin and rarely amphetamines are the illicit drugs usually transported by body packers. Generally, the purity of the transported drugs is usually 5-8 times higher compared with those bought on the street¹⁶. Each pack usually contains some grams of the illicit drug and if single pack bursts, taking into account the high purity of the drug, the amount of the toxic substance that enters the blood circulation is higher than in cases of common drug abuse. However, the absorption from the gastrointestinal tract may be slower than direct intravenous injection.

Cocaine after oral administration is well absorbed in the gastrointestinal tract and undergoes excessive first-pass metabolism by liver esterase and plasma cholinesterase to ecgoninemethylester (EME), one of the major metabolite and nonenzymatic hydrolysis results in formation of other major metabolites.

In present case the amount of Cocaine in each capsule is 22 – 26 grams. In this case one capsule in large intestine was found ruptured with powder leakage at that site due to which there has occurred intoxication with rise in blood concentration of Cocaine and patient has died immediately.

CONCLUSION

The present paper presents an accidental death of a Cocaine body packer in Mumbai. The deceased was in panic and has tried to run, while running he fell on the ground. The autopsy and toxicological analysis revealed 119 intact wrapped packets containing Cocaine in gastrointestinal tract, one ruptured packet in the large bowel and a Cocaine blood concentration of 1.15 mg/100ml. The internal examination indicated generalized viscera congestion, pulmonary edema. This accidental death of a body packer in Mumbai indicates that body packing is an existing problem in India.

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Dr. A J Patowary, Associate Professor Forensic Medicine, Gauhati Medical College, Guwahati was appreciated at IAFM Conference held at Chennai in 2015 for Good Show at IAFM Conference "Forensic Medicon 2014" held at Guwahati, Assam in Year 2014



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CASE REPORT

Von Hippel-Lindau disease: Imaging findings: A single case report

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Accepted (Revised): December 16, 2014

ABSTRACT

Von Hippel Lindau disease is an autosomal dominant multisystem/multitumoral cancer disease diagnosed by clinical, radiologic and genetic findings. Its prevalence has been estimated to be of one per 36000 inhabitants. The disease is characterized by abnormal vascular proliferation and development of a variety of benign and malignant tumors in multiple organ systems.

Keywords: Von Hippel-Lindau disease, diagnostic imaging; Magnetic resonance imaging.

INTRODUCTION

Von Hippel-Lindau disease is caused by mutation in VHL tumour suppressor gene localized on chromosome 3p25¹. Hallmarks of the condition include retinal angiomas, hemangioblastomas of the cerebellum and the spinal cord, renal cell carcinoma and cysts, and pheochromocytomas. The disease is named after Eugen von Hippel and Arvid Lindau².

In this article, we report imaging findings in a case of VHL disease who presented to us for routine Ultrasound. This case highlights the importance of suspecting possibility of VHL in patients with multiple pancreatic cysts.

CASE REPORT

A thirty-five years old man, who presented with vomiting and dizziness, was admitted to our hospital for further examination. On routine Ultrasound we noted the presence of multiple pancreatic cysts. On further enquiry he admitted to having difficulty walking, standing or moving in a coordinated manner which were symptoms referable to the cerebellum. He also had persistent headache and dizziness. He however denied any family history of malignancy or early death. Based on symptoms referable to the cerebellum and strong clinical suspicion he underwent CT scanning in our department.

RADIOLOGICAL FINDINGS

On NECT, a fairly well defined mixed solid-cystic lesion with internal and perilesional hypodensity suggestive of

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intratumoural and peritumoural cysts was noted in the right cerebellar hemisphere. Mild perilesional edema, compression of the fourth ventricle and upstream hydrocephalus was noted. There was no calcification or hemorrhage within the lesion. Intense fairly homogenous enhancement of the solid component of the tumour was noted on post contrast study, without enhancement of the walls of the peritumoural cyst. The decision to do an MRI for complete evaluation of the brain and spinal cord was made. CEMR study of brain and spine revealed a solid lesion with intra and peritumoural cysts in the right cerebellar hemisphere with moderate perilesional edema. The solid component appears so intense on T1 and T2WI. The intratumoural cyst appears mildly T1 hyperintense and does not suppress completely on FLAIR suggesting high protein content. The peritumoural cystic component suppresses on FLAIR and is T1 hypointense. There is moderate perilesional edema. Cyst formation in HGBLs is a result of vascular leakage from tumour vessels and not tumour liquefaction or active secretion. Few flow voids due to enlarged vessels are seen predominantly in the periphery of the lesion. In addition the ipsilateral transverse and sigmoid sinuses and the IJV were dilated, possibly from high flow from the lesion. There was mass effect in the form of mild herniation of the cerebellar tonsils through the foramen magnum, contralateral displacement of the vermis and compression of the fourth ventricle with resultant upstream hydrocephalus and interstitial edema in the periventricular region. There was no diffusion restriction through the lesion. MR spectroscopy through the solid enhancing component of the lesion showed elevated Choline peaks with depression of NAA and creatine peaks with Cho: NAA ratio of 2.5. Similar spectroscopic picture was also obtained in the peritumoural region. On post contrast study, there was intense enhancement of the solid component of the lesion without enhancement of walls of the peritumoural cysts. In addition a T2 isointense and T1 hypointense subependymal nodule one cm caudal to the fourth ventricle was noted which showed intense post contrast enhancement. Multiple T2 hyperintense cysts were noted involving the cervical and dorsal cord with a T2 isointense intramedullary lesion in dorsal sub pial location at the level of D3 vertebral body. There was extensive perilesional edema. The solid T2 isointense intramedullary lesion showed intense post contrast enhancement with no enhancement of the cysts.

DISCUSSION

The VHL gene was identified in 1993 by Latif *et al.* by positional cloning¹. The responsible gene, located on the chromosome 3p25-26 has high penetrance but delayed or variable expression and may cause widely different clinical manifestations.

The clinical manifestation of the disease is reported in 14 different organs with 40 different lesions. These include retinal and CNS hemangioblastomas, endolymphatic sac tumours, renal cell carcinomas and cysts, pancreatic tumours and cysts⁴, pheochromocytomas, and epididymal cystadenomas^{5,6}.

The most common CNS tumour is hemangioblastoma and occurs in 40% of patients⁷. Symptoms often begin in the second to third decades of life. Patients may present with neurologic symptoms such as headache, ataxia, and blindness or they may be asymptomatic.

VHL-associated hemangioblastomas demonstrate a 'saltatory' growth pattern characterized by quiescent periods (approx two years). Nearly half of all patients develop *de novo* lesions after the initial diagnosis of VHL. The median life expectancy is 49 years. Usually morbidity and mortality are associated with frequent surgeries. Renal cell carcinomas are the cause of death in 30-50% of the patients⁸.

The family history is positive in 80% cases while the other 20% of the cases are due to mutation *de novo*.

THE DIAGNOSTIC CRITERIA FOR VHL IN SPORADIC CASES ARE

- More than one hemangioblastoma in the CNS,
- One CNS hemangioblastoma and visceral manifestations of VHL

Molecular genetic testing allows the identification of a deletion or significant mutation that confirms the diagnosis of VHL disease⁹. Two VHL phenotypes are recognized and distinguished by the presence or absence of pheochromocytoma¹⁰.

Type I VHL: includes patients with low risk of VHL.

Type II VHL: includes patients with high risk of VHL.

- Type 2A (low risk of renal cell carcinoma)
- Type 2B (high risk of renal cell carcinoma)
- Type 2C (familial pheochromocytoma, no hemangioblastoma or renal cell carcinoma)

FIGURES



Figure 1 Axial NECT showing a fairly well defined predominantly solid mass with internal and peritumoral hypodensity and perilesional edema. The solid component appears isodense to grey matter.



Figure 2 Axial CECT showing homogenous enhancement of the solid part of the lesion with lack of enhancement of the internal necrotic part and walls of the peritumoral cyst. The wall of peritumoral cyst is formed by compressed gliotic brain.



Figure 3 (A-C) T1, T2 and FLAIR weighted images showing solid lesion with intra and peritumoral cyst in the right cerebellar hemisphere. The solid component appears isointense to grey matter on T1, T2 & FLAIR images. The intra tumoural cyst appears mildly T1 hyperintense and does not suppress completely on FLAIR. The peritumoral cystic component suppresses on FLAIR. There is moderate perilesional edema. Few flow voids due to enlarged vessels are seen predominantly in the periphery of the lesion.

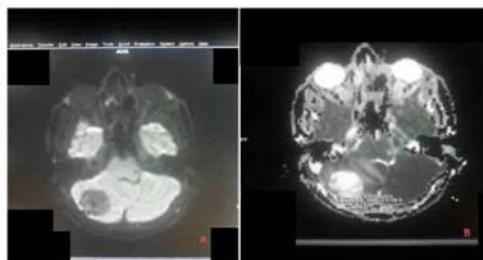


Figure 4 (A and B) DW imaging and ADC mapping showing lack of diffusion restriction.

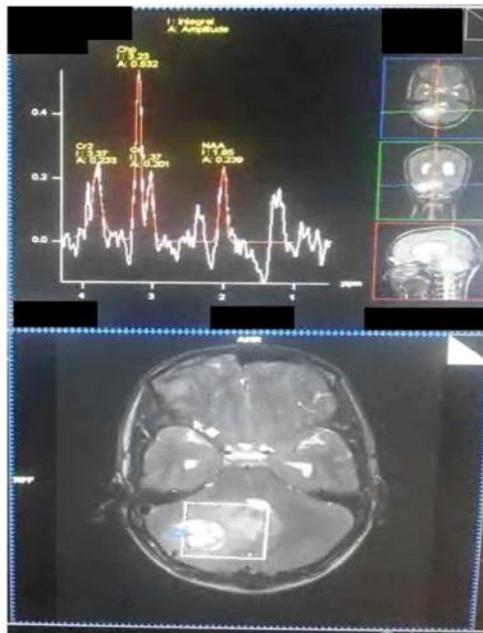


Figure 5 MR Spectroscopy the solid enhancing component of the lesion showed elevated Choline peaks with depression of NAA and creatine peaks with Cho: NAA ratio of 2.5. Similar spectroscopic picture was also obtained in the peritumoral region.

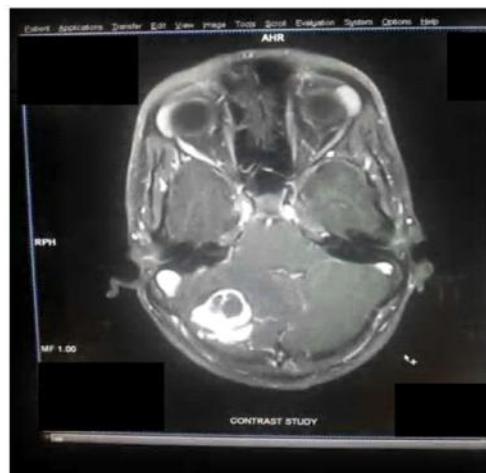


Figure 6 Axial post contrast MR showing intense enhancement of the solid component of the lesion without enhancement of the walls of the peritumoral cysts.



Figure 7 Multiple T2 hyperintense cysts were noted involving the cervical and dorsal cord with a T2 isointense

intramedullary lesion in dorsal sub pial location at the level of D3 vertebral body. There was extensive perilesional edema. The solid T2 isointense intramedullary lesion showed intense post contrast enhancement with no enhancement of the cysts.

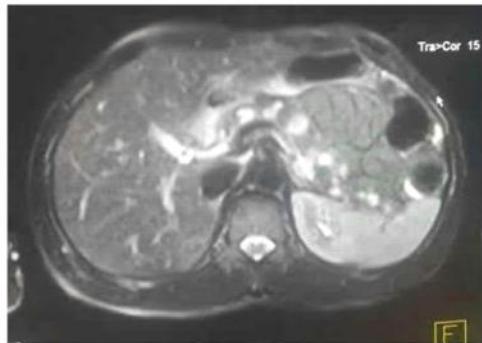


Figure 8 T2 weighted axial image of upper abdomen showing multiple intrapancreatic cysts of varying sizes.



Figure 9 Sagittal post contrast T1-FS images showing enhancing subependymal nodule caudal to the fourth

ventricle along with enhancing dorsal sub pial intra medullary lesion. These nodules are seen to abut pial surface. There is absence of enhancement in the cysts.

CONCLUSION

Early diagnosis, genetic consultation, adequate screening and correct therapeutic management are essential for patients with VHL syndrome. Being familiar with its imaging manifestations will be essential for making a correct diagnosis and providing guidance for further investigations. Imaging plays a key role in the identification of abnormalities and in the subsequent follow up of lesions. It is also important in the screening of individuals who are not yet symptomatic.

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Dr. Antara Debbarma, Post Graduate Trainee of Forensic Medicine and Toxicology, Agartala Government Medical College and Gobind Ballab Pant Hospital (AGMCGBPH), Tripura receiving Best Paper Certificate at 1st Annual National Conference of Medico legal Society of Assam, "MELSA CON 2014" held at Tezpur Medical College, Tezpur, Assam, India

CASE REPORT

Variant of Isodora Duncan Syndrome

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ABSTRACT

Developing countries like India often have regional peculiarities quite different from the western countries. The stole (dhupatta) worn by ladies in the sub-continent have higher risk to get entwined in the moving wheels of the vehicle while they are travelling. The free end of the stole might just prove to be fatal enough to end one's life. This condition got public attention when the famous dancer Isodora Duncan died on September 14th, 1929. Here we report one such case, wherein a pillion rider while she was travelling in a two-wheeler ended her life when her stole (dhupatta) got entwined in the wheels of the two-wheeler in which she was travelling.

Key Words: Isodora Duncan Syndrome Stole (Dhupatta), Sub-continent, Two-wheeler.

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INTRODUCTION

A dupatta (stole) is a long cotton or nylon scarf worn by women in the Indian subcontinent. The middle part goes in front of the woman's chest, and both ends go back over her shoulders and hang loosely at the back¹. The long loose ends of a dupatta, long scarf, saree (another traditional Indian garment), chunni (a scarf similar to the dupatta), or long skirt may get entangled in moving wheels or machinery and cause trauma to a body part¹. Strangulation by long scarf is caused as a consequence of scarf being caught in the wheel spokes of a vehicle. The free end of the stole might just prove to be fatal enough to end one's life. This condition got public attention when the famous dancer Isodora Duncan died on September 14th, 1929. The long scarf, which she was wearing, became caught in the wheels of Bugatti car. Subsequently, cases related to scarf have been reported and labeled as 'long scarf syndrome' or 'Isodora Duncan syndrome'².

CASE DETAILS

A middle-aged female was brought to the autopsy by XYZ Police Station to Department of Forensic Medicine and Toxicology, SIMS and RC, Bengaluru on 9th June 2013, with alleged history of self-fall of a pillion rider from a two-wheeler on the way to home. The pillion rider while travelling in two-wheeler suddenly fell down on the road due to entwined stole (dhupatta) to the rear wheel of the vehicle. She was immediately rushed to the hospital from the injury site. In the casualty it was recorded as 'Brought Dead'.

AUTOPSY FINDINGS

A middle-aged female on external examination was wearing a chudidhar along with a dhupatta. The dhupatta showed multiple tears along with grease stains (**Figure 1**).



Figure 1 Dhupatta showing multiple tears

EXTERNAL INJURIES

1. An oblique incomplete abrasion (**Figure 2**) measuring 30cm x 1.5cm present over front, left side & back of upper part of neck, situated 8cm below the mid-point of chin, 7cm below the left ear lobe, 3cm below the hair line at the back of the neck.



Figure 2 Oblique incomplete abrasion

2. Laceration measuring 4cm x 2cm x scalp tissue deep present over back of head in the right occipital region, situated 7cm behind the right ear.
3. Abrasion measuring 4cm x 3cm present over back of right elbow region. Abrasion measuring 2cm x 1cm present over back of right wrist region.

Abrasions were bright red in color. All injuries were ante mortem in nature and fresh.

Internal injuries

- i. **Chest and Abdomen Walls and Cavities:** 4th to 9th Ribs on the right side were fractured in the anterior axillary line. Pleural cavity contained 500ml of blood.
- ii. **Cardiovascular system:** Heart was normal in size, coronaries were patent.
- iii. **Respiratory System:** Both lungs were edematous and pale. C/S exuded minimal blood.
- iv. **Digestive System:** Stomach contained 200ml of yellow coloured partially digested rice meals. No unusual smell. Normal mucosa. Intestines contain gas and its contents.
- v. **Hepatobiliary System:** Liver parenchyma was normal.
- vi. **Reticuloendothelial System:** Normal
- vii. **Urogenital System:** Bladder was empty. Uterus was normal in size. Cavity empty.
- viii. **Endocrine Organs:** Intact.
- ix. **Head:** On reflection of scalp, extravasation of blood over an area of 5cm x 4cm present over right parieto-occipital region (**Figure 3**). Comminuted fracture measuring 7cm x 5cm present over the right parietal region (**Figure 4**). Fissured fracture measuring 6cm present over the left middle cranial fossa. Fracture end shows extravasation of blood. Brain is intact and congested. Diffuse sub-dural and sub-arachnoid hemorrhage present all over.
- x. **Neck and Pharynx:** Intact.
- xi. **Spinal Column and Cord:** Intact.



Figure 3 Extravasation of blood in scalp.



Figure 4 Shows fracture in skull

Cause-of-death statement: Cause of death was opined, as shock and hemorrhage as a result of head injury sustained consequent upon fall from two-wheeler due to entwining of dhupatta to the rear wheel of the vehicle.

DISCUSSION

The long loose end of the dhupatta, long scarf, saree or long skirt may get entwined in moving two wheelers while travelling. Long scarf (Chunni, oodhani) worn by Indian women resulted in number of cases of accidental strangulation with loss of life. Accidents occur when the scarf's free floating end becomes entangled in moving wheel; the unprotected spokes of wheel traps the scarf

(Chunni, oodhani) worn by females³. The scarves are 6-12 feet in length and are slackly wrapped about the neck with their ends flowing freely⁴. Cases have been documented where the clothes worn by the person had proved to be fatal when they are travelling in a two-wheeler or an auto rickshaw. The first written case report of accidental strangulation in an adult was the world famous dancer Isadora Duncan who died on 14th September 1929 the long scarf, which she was wearing, became caught in the wire wheels of her Buggati car, stopping the vehicle. Isadora died at the spot and was later found to have sustained a fractured larynx on a carotid artery injury⁵. Aggrawal N K et al, Kohli, document cases A, Verma S K^{6,7}. Rajesh M et al., reported a case of fatal long scarf syndrome: a case report of unusual cause of death⁸. Zine KU et al., reported a case of Accidental Ligature Strangulation with Avulsion of Scalp⁹.

CONCLUSION

These incidents raise the need for preventive measures to be introduced or followed to avoid further occurrence. In summary, this case exemplifies the unsuspected inherent danger of wearing long scarf while traveling in a vehicle with unprotected wheels.

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Conflict of interest: No conflict of interest associated with this work.

Contribution of authors: We declare that the authors named in this article did this work and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. Myself, Dr. Yadukul S, did this case. Along with me, Dr. Shiva Kumar BC and Dr. Udayashankar BS helped in taking the photographs, analyzed the case in detail along with other relevant studies done in this regard.

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Academic Excellence of Founder Life Member of IJHRMLP



Dr. A J Patowary, Associate Professor, Forensic Medicine, Gauhati Medical College, Guwahati has been conferred with the ***Fellow of the NFCFM*** in its Siliguri conference by the President of NFCFM Prof. Nagesh Kumar G. Rao in Aug. 2011, in recognition of contribution of a new autopsy incision "***The Fourth Incision - A Cosmetic Autopsy Incision***"

CASE REPORT

Factors Influencing Hippuric acid as a Biomonitor for Toluene Exposure

Taher A. Suliman Khalifa

Accepted (Revised): December 28, 2014

ABSTRACT

A 36 years old technician working in a special laboratory for the analysis of crude oil had been found with high urine level of hippuric acid. Hippuric acid urine levels can be used as a biological monitor to detect toluene toxicity but there are other natural and unnatural causes of hippuric acid production. Before taking samples for analysis, precautions should be taken concerning the type of food, drinking tea or coffee, and smoking as these factors may affect the levels of hippuric acid in the urine.

Key Words: Toluene, Hippuric Acid, Urine, Biomonitor

CASE REPORT

A 36 years old male technician is working in the laboratory for the analysis of crude oil for a period of 10 years. He is a smoker (15-20 cigarettes/day) and drinks tea and coffee. During his work he is exposed to toluene, for which hippuric acid is used as a biomonitor. He had been found with elevated levels of hippuric acid (1.8 g/L) in his urine during a routine physical and laboratory checkup. A second sample had been taken after stopping tea and coffee as well as stopping smoking and a dietary restriction for foods and drinks containing benzoic acid. The second result was within normal limits (0.6 g/L).

DISCUSSION

Crude oil is a complex mixture of aliphatic and aromatic hydrocarbons. Toluene is an aromatic hydrocarbon, occurring naturally in crude oil. Toluene has numerous commercial and industrial applications and is a solvent in paints, lacquers, thinners, glues, nail polish remover, and is used in the printing and leather tanning processes, and as a by-product in the manufacture of styrene. Toluene is the most popular solvent used in industry¹.

Occupational exposure to toluene may lead to adverse health problems. Chronic effects on CNS include neuropsychosis, cerebral and cerebellar degeneration, seizures, choreoathetosis, optic and peripheral neuropathies, decreased cognitive ability, optic atrophy, blindness, ototoxicity, and deafness. Toluene effects on the heart include direct negative effects on cardiac automaticity and conduction and can sensitize the myocardium to circulating catecholamines. "Sudden sniffing death" secondary to cardiac arrhythmias has been reported. Hepatotoxicity may occur after prolonged

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toluene exposure. A rare form of hepatitis (hepatic reticuloendothelial failure) has been reported with toluene exposure. Reported renal toxicity from toluene exposure includes renal tubular acidosis, hypokalemia, hypophosphatemia, hyperchloremia, azotemia, sterile pyuria, hematuria, and proteinuria. Hematologic consequences of exposure may include lymphocytosis, macrocytosis, eosinophilia, hypochromia, and basophilic stippling, and in severe cases, aplastic anemia.

Hippuric acid level in urine is used as biomonitor to detect degree of toluene exposure. Hippuric acid is an organic acid called by this name because it was firstly found in the urine of hippos. Hippuric acid does not accumulate and is rapidly excreted in urine where about 97% may be excreted in the first 4 hours².

In humans, hippuric acid appears as an excretory product from natural sources signaling metabolic dietary sources of hippuric acid³. The metabolic sources include the dietary proteins and quinic acid in colored foodstuffs³. The normal excretory level of hippuric in the urine is up to 1 g/L according to Biosentia Labs (Germany) where analysis had been done and the same level had been approved by Japanese Regulation and Prevention of Organic Solvent Poisoning⁴.

Hippuric acid is still the most used indicator in the bio monitoring of toluene-exposed workers because it shows a good correlation with the exposure levels⁵. Hippuric acid appears in the urine as a metabolite of toluene; it is metabolized to benzoic acid, which conjugates with glycine in the liver to yield hippuric acid⁶. Severity of chronic toluene toxicity increases among toluene abusers "glue sniffers", or from environmental contamination⁷.

There are many factors, other than toluene exposure, that could influence the urinary excretion of hippuric acid. These factors should be kept in consideration before taking urine for the determination of hippuric acid level.

The factors are:

1. Benzoic Acid Intake: benzoic acid is an important source for hippuric acid production. Most of the benzoic acid is derived from dietary components, whereas a smaller part is excreted as a result of intermediate amino acid metabolism⁸. Benzoates are used as preservatives

for several foods because of their antimicrobial effect that is related to their activity against yeasts and moulds, and to a lesser extent against bacteria, examples of foods with benzoates include fruit juice, lemonade, ketchup and mustard⁸. Benzoic acid is rapidly absorbed and thereafter rapidly and completely excreted as hippuric acid in the urine⁸. Szadkowski et al.⁹ have shown that a meal of food containing benzoic acid caused a threefold increase of hippuric acid excretion. Other than benzoic acid, some aromatic phenolic acids from ingested edible fruits such as blueberry, cherry, raspberry, melon, and blackberry led to increased concentrations of excreted hippuric acid¹⁰, the same increase was found after the consumption of grapes, apples, peach and plums¹¹.

2. **Alcohol Consumption:** Alcohol interacts with toluene metabolism, and could have different effects on its metabolism; chronic consumption causes stimulating effects while acute consumption leads to inhibiting effects^{12,13}. This is a possible explanation for the controversial effects of alcohol consumption on urinary excretion of hippuric acid in humans exposed to toluene, reported by different studies. Dossing et al.¹⁴ and Baelum et al.¹⁵ recorded a reduction in hippuric acid urine levels after alcohol consumption in comparison to Bavazzano et al.¹⁶ who recorded an increase in the elimination of hippuric acid into urine. An interesting study by Hjelm et al.¹⁷ found that the excretion of hippuric acid in urine is reduced when alcoholic drinks are combined with a carbohydrate restricted diet. Siqueira and Paiva¹ had found that alcohol consumption does not affect urine levels of hippuric acid among individuals who are not exposed to toluene.
3. **Cigarette-Smoking:** according to Inoue et al.¹⁸, the combination of alcohol and cigarettes reduces hippuric acid in the urine of workers exposed to toluene. Siqueira and Paiva¹ did not find significant differences in hippuric acid excretion between subgroups of smokers/non-smokers and alcohol drinkers and non-drinkers were observed.
4. Black tea consumption was found to increase hippuric acid excretion¹⁹. In another study the consumption of black or green tea was found to increase hippuric acid excretion²⁰.

- Coffee consumption may result in increased levels of hippuric acid in the urine⁴.

CONCLUSION

In our case study; the first result of hippuric acid urine level is 1.8 g/L, which is slightly higher than the normal level (up to 1g/L). The first sample was taken without precautions of the above-mentioned factors. A second sample was taken after stopping smoking, drinking tea and coffee, and avoidance of all possible foods and drinks that may contain benzoic acid. There is no history of alcohol consumption. The result of second sample was 0.6 g/L i.e. within normal limits.

For optimal accuracy when using hippuric acid level as a biomonitor for toluene exposure, the following precautions should be taken before taking the urine sample:

- Diet restrictions during the sampling day and on the day before sampling should be used to avoid the intake of benzoic acid and therefore to avoid changes in hippuric acid levels. The foods and drinks that contain benzoates include any of the following permitted preservatives according to the European Union (E numbers 210-219).

| |
|--|
| E210 or Benzoic acid |
| E211 or Sodium benzoate |
| E212 or Potassium benzoate |
| E213 or Calcium benzoate |
| E214 or Ethyl 4-hydroxybenzoate or Ethyl para-hydroxybenzoate |
| E215 or Ethyl 4-hydroxybenzoate, sodium salt or sodium ethyl para-hydroxybenzoate |
| E216 or Propyl 4-hydroxybenzoate or Propyl para-hydroxybenzoate |
| E217 or Propyl 4-hydroxybenzoate, sodium salt or sodium propyl para-hydroxybenzoate |
| E218 or Methyl 4-hydroxybenzoate or Methyl para-hydroxybenzoate |
| E219 or Methyl 4-hydroxybenzoate, sodium salt or Sodium methyl para-hydroxybenzoate. |

- Tea and coffee drinks should not be taken at least 24 hours before taking the sample.
- Smoking and alcohol consumption should be stopped for optimal results without possible false positive results.

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Dr. Antara Debbarma, 3rd Year Post Graduate Trainee of Forensic Medicine and Toxicology, Agartala Government Medical College and Gobind Ballab Pant Hospital (AGMCGBPH), Tripura receiving 2nd Best Paper Certificate (Scottish Travel) at 36th Annual National Conference of IAFM at SRM College, Chennai in Year 2015

CASE REPORT

Forensic Analysis of a Mandible- A Case Report on Bilateral Mandibular Permanent Central Incisor Hypodontia

Sarmah Pratap Chandra¹, Das Abhishek², Mishra Ashim³, Sarma Kalyan⁴

Accepted (Revised): December 28, 2014

ABSTRACT

"Forensic eye is deep and penetrating"- so goes the saying. To look closely to reveal the hidden and untold facts should be the prime notion of a forensic expert. Skeletal remains examination is such an informative aspect. As age and sex are the most important primary data for identification, the field of forensic anthropology is not an exception. It gives many information and inference in anthropological ageing, sexing and other forensic investigations. A mandible, kept for years in the department as a teaching material without any history, revealed such a few interesting facts and explanations. There was an unexplained, mysterious gap in the midline between two lateral incisors and later on this "missing link" was established as a result of congenital absence of bilateral mandibular permanent central incisor teeth. Vivid and minute examination along with thorough research ultimately revealed the whole informations.

Key Words: Forensic Anthropology, Mandibular Teeth, Congenital Absence, Central Incisor

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INTRODUCTION

Human body is composed of different tissues, starting from the very soft mucus membranes to stony hard bones. These together give shape to human body. Human skeleton is an excellent material for the anthropological, genetic, medical, dental and other research purpose. In forensic identification, age and sex are taken as primary data. As per Krogman, pelvis (95%) followed by skull (90%) is the most informative bone in anthropological sexing.¹ Notably, mandible is the strongest bone of the skull which shows very prominent sexual dimorphism and age related changes.² Even it can be used as a weapon as it forms the lower jaw and holds the teeth. So study of various attributes of mandible has been researchers delight for years. In this present paper a number of interesting informations and peculiarities of mandible examination will be discussed which is often mistaken or overlooked by the learners.

CASE HISTORY

In the Department of Forensic Medicine and Toxicology, Sikkim Manipal Institute of Medical Sciences, we came across a sample of mandible bone which was kept in the department since a long time as teaching material. The history or the background informations including the source of this sample was not known or available.

Examination Findings (Figure 1, 2, 3, 4):

The characteristics of the mandible were as follows:

1. It was of larger size and massive mandible with prominent anatomical landmarks.

2. The chin was square shaped.
3. Symphysis mentis was prominent.
4. Condyles were large, the level of which was above the coronoid process in anatomical position.
5. The mental foramina were at the middle of the body in between the alveolar process and the lower border of the body.
6. The anatomical/ gonial angle (useful for determining sex) was everted.
7. The medico-legal angle i.e. angle between the superior border of body and ramus was slightly obtuse.
8. Prominent mental protuberance and mental tubercle along with sharp mental spine.
9. Total number of the teeth with sockets was fourteen (14) in number, seven (7) on each side of midline.



Figure 1 Everted anatomical angle



Figure 2 Condyles higher than coronoid process



Figure 3 Mental foramen and attrition of right first molar teeth



Figure 4 Gap between two lower lateral incisors and inclination of the lateral incisors toward midline

Careful examination revealed a gap in the midline exactly in the place of lower central incisors. It indicates there was falling of the both deciduous central incisor teeth earlier than the other teeth, which are evident from the remaining sockets. There is no evidence of bony injury or loss of bony tissue at the margin of the socket or evidence of adherent blood. So it can be opined that the falling of both central incisors is not consistent with that of a traumatic variety. The resolution of the sockets of both these lower central incisors indicates their far earlier than fall of the other neighboring teeth as evident from the sockets, which can be few months to years according to the particular subject profile depending upon the genetic, nutritional, and constitutional and other factors. The count of teeth is seven on each side. But it is misleading to ascertain the age of the subject. According to the number of teeth present (fourteen in total) the common inference will be non-eruption of the both sided permanent third molar teeth though there are three permanent molars on each side present. It proves the necessity of identifying and giving due importance to the characteristics of the each and individual tooth.

The degree of attrition of the mandibular teeth was also notable. It is. It is having a second degree (A++) of attrition, which is evident in the 1st molars present. Considering only this data of Gustafson's method, the age of the person is very likely to be above 35 years (about 35 to 45 years).

The possibility of congenital and permanent absence of any tooth must not be forgotten which is often found in lower lateral incisors commoner than central ones.

So, before opining about the age, following findings should be taken care of:

1. Total number of teeth including the sockets.
2. Character of each tooth with individual morphology for identification of the particular tooth.
3. Degree of ageing changes of the tooth. (Gustafson's criteria)
4. Absence of incisor teeth, which is commoner in case of, laterals ones than the central variety.

DISCUSSION

General characteristics, discussed above, prove that it belongs to a male person. The central gap draws the attention about the fact that after falling of deciduous lower central incisor, there was no eruption of permanent central incisor teeth in the respective mandible. It is very uncommon and practically rare incident. Usually as lateral incisors erupt after central incisors, the direction of the longitudinal axis of the sockets of lateral incisor is found to be inclined towards the centre with the tendency to minimize the gap created by non-eruption of both the permanent central incisor teeth. Possibility of non-eruption of deciduous central incisor is practically nullified by the evidence of resolution of the socket margins upto the surface of the bone.

The odontologists in living report most of the dental peculiarities, but it has enormous forensic implications. The extent of these anomalies poses many problems as facial appearance, malocclusion, and mastication difficulty or speech problems. These help in identifying a person too. Oligodontia is congenital absence of six or more teeth excluding molars and hypodontia refers to congenital absence of less than six teeth excluding molars.³ So, the present rarity is a case of bilateral mandibular permanent central incisor hypodontia. Prevalence of hypodontia in deciduous teeth is about 0.1-0.9%, whereas it is 2-10% in permanent variety. Females have shown higher prevalence than males. The first report on congenitally missing bilateral mandibular

incisors was given by Newman in 1967.⁴ Unilateral or bilateral maxillary lateral incisors are absent congenitally most commonly, followed by maxillary second premolar and mandibular central incisors.⁵ But agenesis of bilateral mandibular permanent central incisors is not well documented.

The author in his thesis work on stated that congenital absence of third molar though not uncommon, lateral incisors, premolars, rarely canine and even central incisors may show agenesis alone or in combination with others.⁶ In 1998, Newman & Newman proposed the following theories to explain causes of such agenesis: Firstly, familial or hereditary distribution, Secondly, during formation of mandibular symphysis tooth buds can be disturbed, Thirdly, failure of attempt to locate itself in the short dental arch leading to reduction of dentition, Fourthly and finally, localized infections or inflammations of jaw leading to disturbed dental tissue buds.⁷

Congenital absence of multiple primary teeth as many as fourteen has also been reported.⁸ Pirinen Sinikka *et.al.* proposed the possibility of autosomal recessive trait in lower incisor hypodontia.⁹

It can be conclusively stated that congenital absence of mandibular bilateral permanent central incisors is a rare incidence and one should be aware of that during opining such cases.

CONCLUSION

It can be conclusively stated that congenital absence of mandibular bilateral permanent central incisors is a rare incidence and one should be aware of that during opining such cases.

Conflict of Interest: None

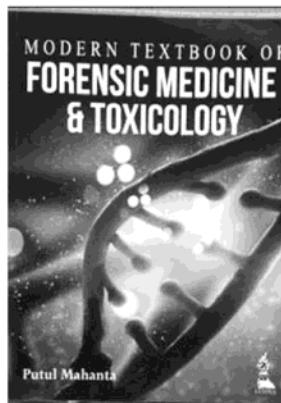
Ethical clearance: Not required

Declaration: The manuscript is an original research work and not been submitted anywhere for publication.

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BOOK REVIEW



Modern Textbook of Forensic Medicine and Toxicology

By Dr. Putul Mahanta

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Reviewed by: Prof. P C Sarmah

Modern Textbook of Forensic Medicine and Toxicology is a well-spoken exposition of the essence of medico legal issues, which has truly indispensable information for all the medical students (both Under-Graduate and Post-Graduate) and for those doctors irrespective of their specialty working in the rural areas, police and lawyers. This book has been well written to cover the needs of undergraduate as well as the postgraduate students by following the whole curriculum as per Medical Council of India (MCI).

The book contains 52 chapters along with a number of useful proforma as an Annexures. A good number of new topics such as Forensic Osteology; Forensic Odontology; Human Rights, Custodial Torture and Deaths; Crime Scene Investigation and Techniques in Museum, have increased the depth and width of the book. All the text illustrations are updated with recent advancement on forensic medicine. The author Dr. Putul Mahanta has given all the legal updates of the text with appropriate references for the conveniences of the reader, which are essential to understand the source of the text for faster and better comprehension.

The layout, paper quality and the printing of the book have been of very high standard. High-resolution photographs, drawings, flow charts, and tables in the book are appropriate and exceptionally useful. Color photographs presented in different chapters are excellent. The language is simple and easily understandable.

Special emphasis has been given by different contributing authors to the upcoming concepts such as biomedical waste management, human experimentation, DNA profiling and related issues. It would be useful not only for the students and the doctors working in rural hospitals who deal in the maximum number of medico legal cases, but also for the faculty of our fraternity, besides students pursuing careers in Dentistry, Ayurvedic and Homeopathic professions.

The book is a concise and informative one, which has covered all the vital aspects of Forensic Medicine and Toxicology. I humbly feel it will be an asset to every medical Practitioners to be kept with him for ready reference.

I sincerely hope this book will serve the intent and help the readers to learn the subject. I feel immense pleasure for writing this book review of Dr Putul Mahanta, who has been one of my beloved students and now active and dedicated teacher of the specialty of forensic medicine, has taken pain to include maximum problems in the subject. I congratulate him.

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INSTRUCTIONS TO AUTHORS

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